DRAFT REPORT
ROUND 7 DAM ASSESSMENT
ALLETE, INC. - LASKIN ENERGY CENTER
CELLS A-D AND CELL E IMPOUNDMENTS

November 18, 2010

PREPARED FOR:

U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

PREPARED BY:

GZA GeoEnvironmental, Inc.
19500 Victor Parkway, Suite 300
Livonia, MI 48152
GZA File No. 01.0170142.20

GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

November 18, 2010
File No. 01.0170142.20

Mr. Stephen Hoffman
U. S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Round 7 Dam Assessment - Draft Report
EPA Contract No. EP10W001313
Allete Inc. Laskin Energy Center
Cells A-D Impoundment and Cell E Impoundment
Hoyts Lake, Minnesota

One Edgewater Drive
Norwood, MA 02062
781-278-3700
FAX 781-278-5701
www.gza.com

Dear Mr. Hoffman:

In accordance with our proposal 01.P00000177.11, dated August 11, 2010, and U.S. Environmental Protection Agency (EPA) Contract No. EP10W001313, Order No. EP-CALL-0001, GZA GeoEnvironmental, Inc. (GZA) has completed our inspection of the Allete, Inc. Laskin Energy Center Cells A-D Impoundment and Cell E Impoundment located in Hoyts Lake, Minnesota. The Site visit was conducted on September 23 and 24, 2010. The purpose of our efforts was to provide the EPA with a Site specific inspection of the impoundments to assist EPA in assessing the structural stability of the impoundments under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act Section 104(e). We are submitting one hard copy and one CD-ROM copy of this Draft Report directly to the EPA.

Based on our visual inspection, and in accordance with the EPA's criteria, the Cells A-D Impoundment is currently in **FAIR** condition and the Cell E Impoundment is currently in **SATISFACTORY** condition, in our opinion. Further discussion of our evaluation and recommended actions are presented in the Task 7 Dam Assessment Report. The report includes: (a) completed Field Assessment Checklists; (b) figures of the impoundments; and (c) selected photographs with captions. Our services and report are subject to the Limitations found in **Appendix A** and the Terms and Conditions of our contract agreement.

We are happy to have been able to assist you with this inspection and appreciate the opportunity to continue to provide you with dam engineering consulting services. Please contact the undersigned if you have any questions or comments regarding the content of this Round 7 Dam Assessment Report.

Sincerely,

GZA GEOENVIRONMENTAL, INC.

Doug Simon
Project Manager
doug.simon@gza.com

Patrick J. Harrison, P.E.
Senior Consultant
patrick.harrison@gza.com

Peter H. Baril
Project Director
peter.baril@gza.com

PREFACE

The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of this report.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection, along with data available to the inspection team. In cases where an impoundment is lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions, which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is critical to note that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Prepared by:

GZA GEOENVIRONMENTAL, INC.

Patrick J. Harrison, P.E.
Minnesota License No.: 19017

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EXECUTIVE SUMMARY

This Phase I Inspection/Evaluation Report presents the results of a visual dam inspection of the Allete, Inc – Laskin Energy Center (LEC) Cells A-D and Cell E Impoundments located at 5699 Colby Lake Road in Hoyts Lake, Minnesota. The inspection was performed on September 23 and 24, 2010 by representatives of GZA GeoEnvironmental, Inc (GZA), accompanied by representatives of LEC.

The Cells A-D Impoundment, in its current configuration, has a maximum height of approximately 32 feet above the natural ground surface but typically about 6 feet. The impoundment has a maximum storage volume of approximately 970 acre-feet at the minimum embankment elevation of approximately 1,450 feet MSL. Under U.S. Army Corps of Engineers (COE) guidelines, the impoundment is classified a **Small** size structure. The Hazard Potential Classification for the Cells A-D Impoundment is **Less-Than-Low** under the EPA hazard rating criteria due to the limited potential for failure and limited are of potential impact.

The Cell E Impoundment, in its current configuration, has a maximum height of approximately 22 feet and a maximum storage volume of approximately 380 acre-feet at the minimum embankment elevation of 1,479 feet MSL. Under COE guidelines, the impoundment is classified as a **Small** size structure. The Hazard Potential Classification for the Cell E Impoundment is **Significant** under the EPA hazard rating criteria due to the potential interruption of power generation, and environmental mitigation requirements which might result from a sudden release of impounded Coal Combustion Waste (CCW).

Based on the results of the visual inspection, discussions with LEC personnel, and a review of available design documentation, the following minor deficiencies were noted at the impoundments:

1. Presence of trees on the upstream embankment and top of Cells A-D Impoundment;
2. Potholes and rutting of the crest access road of the Cells A-D Impoundment;
3. No monitoring, maintenance or emergency action plan for the Cells A-D Impoundment;
4. Minor erosion along the down slope toe of the east embankment of the Cell E Impoundment;
5. Minor potholes along the crest gravel access road of the Cell E Impoundment; and,
6. Presence of trees at the down slope toe of the northwest corner of the embankment of the Cell E Impoundment.

GZA recommends that the owner arrange for the following to be performed at the dam:

Studies and Analyses:

1. Evaluate the stability and flowability of the ash contained within the Cells A-D Impoundment.

Operations and Maintenance Activities:

1. Increased mowing of the grasses on the embankments to facilitate daily inspections and reduce the risk of burrowing animals;

2. Repair the potholes present in the gravel crest access road. Grade the road to provide better drainage and reduce future potholing;

3. Clear deep rooted vegetation from embankments and top of impoundments;

4. Document impoundment inspections conducted by facility personnel each shift; and,

5. Extend monitoring, maintenance and emergency action plans to include the Cells A-D Impoundment.

Minor Repairs:

1. Repair rutting present on the Cells A-D Impoundment crest access road.

CELLS A-D IMPOUNDMENT AND CELL E IMPOUNDMENT
ALLETE, INC. LASKIN ENERGY CENTER
HOYTS LAKE, MINNESOTA

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1.0 DESCRIPTION OF PROJECT

1.1 General

1.1.1 Authority

The United States Environmental Protection Agency (EPA), has retained GZA GeoEnvironmental, Inc. (GZA) to perform a visual inspection and develop a report of conditions for the Allete, Inc., dba Minnesota Power, (Allete, Owner) Laskin Energy Center (LEC, Site) Coal Combustion Waste (CCW) Impoundments in St. Louis County, Minnesota. This inspection was authorized by the EPA under the authority of the Comprehensive Environmental response, Compensation, and Liability Act (CERCLA) Section 104(e). This inspection and report were performed in accordance with Request for Quote (RFQ) RFQ-DC-13, dated August 5, 2010 and EPA Contract No. EP10W001313, Order No. EP-CALL-01. The inspection generally conformed to the requirements of the Federal Guidelines for Dam Safety[1], and this report is subject to the limitations contained in **Appendix A** and the Terms and Conditions of our Contract Agreement.

1.1.2 Purpose of Work

The purpose of this investigation was to visually inspect and evaluate the present condition of the impoundments and appurtenant structures (the management unit) to attempt to identify conditions that may adversely affect their structural stability and functionality, to note the extent of any deterioration that may be observed, review the status of maintenance and needed repairs, and to evaluate the conformity with current design and construction standards of care.

The investigation was divided into five parts: 1) obtain and review available reports, investigations, and data from the Owner pertaining to the impoundment and appurtenant structures; 2) perform an on site review with the Owner of available design, inspection, and maintenance data and procedures for the management unit; 3) perform a visual inspection of the site; 4) prepare and submit a field assessment checklist; and 5) prepare and submit a draft and a final report presenting the evaluation of the structure, including recommendations and proposed remedial actions.

1.1.3 Definitions

To provide the reader with a better understanding of the report, definitions of commonly used terms associated with dams are provided in **Appendix B**. Many of these terms may be included in this report. The terms are presented under common categories associated with dams which include: 1) orientation; 2) dam components; 3) size classification; 4) hazard classification; 5) general; and 6) condition rating.

[1] FEMA/ICODS, April 2004: http://www.ferc.gov/industries/hydropower/safety/guidelines/fema-93.pdf

1.2 Description of Project

1.2.1 Location

The LEC is located about three miles northwest of Hoyt Lakes in St. Louis County, Minnesota. The entrance to the Site is on Colby Lake Road. The LEC CCW impoundment is located about ¼ mile west of the power plant, at latitude 47 ˚ 32' 01" North and longitude 92 ˚ 10' 53" West. A Site locus of the impoundment and surrounding area is shown in **Figure 1**. An aerial photograph of the impoundments and surrounding area is provided as **Figure 2**. The impoundments can be accessed by vehicles from an earthen access road from the LEC.

1.2.2 Owner/Caretaker

The CCW impoundments are owned by Allete, Inc., dba Minnesota Power and operated by the LEC.

	Dam Owner/Caretaker
Name	Allete, Inc., dba Minnesota Power, Laskin Energy Center
Mailing Address	5699 Colby Lake Road
City, State, Zip	Hoyts Lake, MN 85936
Contact	Lainie Plotnik
Title	Operations Manager
E-Mail	lplotnik@allete.com
Daytime Phone	218-225-4801
Emergency Phone	911 / (218)225-4808 (LEC Shift Supervisor)

1.2.3 Purpose of the Impoundments

The LEC is a two-unit coal-fired power plant, with a maximum generating capacity of approximately 110 Megawatts. Commercial operation of the facility began in the 1960's. An unlined earthen embankment CCW Impoundment (Cells A-D) was constructed in conjunction with the LEC facility for the purpose of storing and disposing non-recyclable CCW from the LEC facility. The Cells A-D Impoundment was utilized for CCW impoundment until the Cell E Impoundment was put into service in 1999.

Cell E Impoundment functions as a sedimentation basin for bottom ash and scrubber solids which are discharged into the northeast portion of the impoundment. The impoundment receives bottom ash slurry via a 10 inch pipeline; wet well fly ash via a 12 inch pipeline, and underflow fly ash and plant sump discharge via an 18 inch pipeline. A secondary 10 inch bottom ash pipeline and an emergency 4 inch high density polyethylene (HDPE) scrubber drain sump discharge pipeline also can discharge into the impoundment. The solids settle in the Cell E Impoundment and the pump house on the northwest portion of the impoundment returns water

to the plant for reuse and/or treatment and off-site discharge.[2] At the current rate of filling, the impoundment has an estimated useable life of about 10 years. The impoundment was originally structurally designed to accommodate an additional 4 feet of vertical expansion. If eventually constructed, the vertical expansion would add 2 to 3 years of operational capacity to the impoundment.

1.2.4 Description of the Cells A-D Impoundment and Appurtenances

The design and construction of the Cells A-D Impoundment was not documented. No design or as-built construction drawings were available for review. The following description of the impoundment is based on information provided in the Barr Engineering Company (Barr) "Ash Pond Embankments – Spring 2009 Inspection Report", the March 2009 Information Request Response to EPA by Allete and other information provided by LEC.

The Cells A-D Impoundment is located north of the Cell E Impoundment and northwest of the LEC and was put into operation in the 1960's. Cells C and D were decommissioned in 1964 and Cells A and B were decommissioned in October of 2000. Since decommissioning, the mechanical systems have been removed from the pump house located in Cell B. Prior to October of 2000, the Cells A-D Impoundment received bottom ash and scrubber solids. The impoundment contained four ponds (A through D) that were used to clarify process water prior to water being returned to the LEC. Since being decommissioned, the interior embankment that separated Cells A and B has been partially removed.

The Cells A-D Impoundment consisted of an earthfill embankment with a crest length of approximately 8,900 feet[3] and a general height (from the lowest toe elevation to the top of impoundment) of approximately 6 feet. Based on survey information provided by Minnesota Power, the top of impoundment elevation varies from approximately 1450 feet to 1482 feet Mean-Sea-Level (MSL). The impoundment was unlined and the embankments were constructed from native silty sand. Prior to decommissioning of the impoundment, a pump house located on the southeast corner of Cell B was used to return water to the LEC. Since that time, functional components of the pump house have been removed. There was no outlet structure associated with the impoundment and precipitation that enters the ponds either infiltrates into the ground or evaporates. Based on the observed conditions, limited or no storm water runoff enters the impoundment. The top of the impoundment appeared to have had a cover of gravel at one time but was degraded at the time of our Site visit. Based on information provided by LEC, the embankments of the Cells A to D Impoundment have not been overtopped during the history of their operation.

There are thirteen groundwater monitoring wells installed throughout the LEC for periodic quality testing. Three monitoring wells are located within the Cells A-D Impoundment.

1.2.5 Description of the Cell E Impoundment and Appurtenances

The Cell E Impoundment was designed by Barr. The following description of the impoundment is based on information provided in the Barr "Ash Pond Embankments – Spring 2009 Inspection Report", and other information received from LEC.

[2] Based on information provided by Barr Engineering and Minnesota Power on September 23, 2010.
[3] Estimated by GZA using Google Earth software.

The Cell E Impoundment is located northwest of the LEC. The impoundment was put into service in October of 2000 and currently serves as the settling pond and ultimate disposal location for CCW generated by the LEC. CCW is piped into the impoundment where solids are allowed to settle. Water is then returned to the facility from the pumphouse on the northwest portion of the impoundment via a pipeline as shown in **Figure 4**.

The Cell E Impoundment receives water and ash slurry via a 10 inch bottom ash line; wet well fly ash via a 12 inch pipeline, and underflow fly ash and plant sump discharge via an 18 inch pipeline. A secondary 10 inch bottom ash pipeline and an emergency 4 inch HDPE scrubber drain sump discharge pipeline also discharges into the impoundment. The bottom ash pipeline discharges on the northern portion of the impoundment as shown in **Figure 4**. The remaining pipelines discharge at the fly ash trestle in the northeast corner of the impoundment. Ash settles in the impoundment and water is returned to LEC via a pump house in the northwest corner of the impoundment.

The Cell E Impoundment consists of an earthfill embankment with a crest length of approximately 5,020 feet and a general height (from the lowest toe elevation to the top of impoundment) of approximately 22 feet with provisions to raise the embankment by up to 4 feet in the future. The impoundment was constructed by cutting and filling the native soils south of the Cells A-D Impoundment. Based on information provided by Barr, the top of impoundment elevation varies from approximately 1479 feet to 1483 feet MSL. The embankments were constructed with a 4H:1V interior slope and 3H:1V exterior slope. The interior embankment slopes are protected from wave action by a strip of riprap at the water surface and the exterior embankment slopes were designed as a vegetated surface. The embankments were constructed from compacted native silty sand and were lined with a double composite liner consisting of a 60 mil HDPE liner underlain by a geocomposite clay liner (GCL) that was approved by the Minnesota Pollution Control Agency. The composite layers were placed between layers of select-screened sand for protection and performance. The impoundment was designed with no penetrations through the liner system. Compacted fill overlays the select-screened sand and the foundations of the fly ash trestle and pumphouse bear on the compacted sand above the liner. A typical cross section of the embankments and liner system is provided in **Figure 3**.

The pump house foundations bear on soils placed above the double composite liner. Five Ingersoll Rand 12HF16 single stage vertical turbine pumps each capable of pumping 3,000 gallons per minute (gpm) with 55 feet H_20 discharge head are located in the pump house. The pumps draw water from the wet well consisting of two bays, each with a 3 foot by 4 foot opening on the south. The wet well has two steel stop log assemblies that could be used to dewater the bay, if necessary.

Water returned to the LEC from the impoundment is the source of water for the wet scrubbers and the wastewater treatment systems. After being used in the facility operations, water is returned to the impoundment in a closed loop system. Therefore, no water would be available for discharge into the impoundment if the pumps removing water were rendered inoperable.

Instrumentation at the impoundment includes electronic monitoring of water levels, a staff gauge, three groundwater monitoring wells (4A, 4B, 614) installed near the downstream embankment that are used for water quality testing and four settlement monitoring points. The settlement monitoring points were installed in May 2009 and the first readings were taken in

April 2010. Based on the July 1, 2010 Barr "Ash Pond Embankments – Spring 2010 Inspection Report", significant movement or settlement did not occur between May 2009 and April 2010. The location of the groundwater monitoring wells and settlement monitoring points is provided on **Figure 4**.

1.2.6 Operations and Maintenance

The impoundments are operated and maintained by LEC personnel. Operation of the Cell E Impoundment includes operation of the return pumps and periodic movement of the bottom ash discharge pipeline. Maintenance of the Cell E Impoundment includes periodic herbicide application for deep-rooted vegetation removal and regular inspection of the condition of the impoundment.

Operation and maintenance of the LEC facility, including the impoundments, is regulated by the EPA under the National Pollutant Discharge Elimination System (NPDES) Permit No. MN000990. Operation and maintenance of the LEC and the Cell E Impoundment is also regulated by the Minnesota Department of Natural Resources (MDNR) – Dam Safety Unit under National Inventory of Dams No. MN01052, and the Minnesota Pollution Control Agency (MPCA). The Cells A-D Impoundment is no longer regulated by the MDNR but is monitored by the MPCA. Based on the current design and embankment height, the maximum operating pool elevation in the Cell E Impoundment is 1476 feet MSL.

The LEC personnel monitor the Cell E Impoundment according to a series of protocols. These protocols include:

- Continuous electronic monitoring of the water levels in the Cell E Impoundment from the LEC;
- Visual observations of the condition of the impoundment and the pipelines are performed every six hours, 365 days a year, but typically not documented;
- Annual monitoring for movement of the survey monuments; and,
- Annual inspection of the impoundment by a consulting engineer.

An example of the electronic Cell E Impoundment water level measurements for the previous year was provided by LEC. Based on information provided by LEC, the daily inspections are performed by LEC personnel; annual monitoring of the survey monuments are performed by Minnesota Power engineering personnel; and the annual inspection of the impoundment is performed by Barr.

As part of the MDNR Dam Safety Unit program, the impoundment is inspected every 4 years by MDNR Dam Safety personnel. A report of the MDNR visual inspection, including recommended actions to correct any deficiencies, is sent to LEC personnel following each inspection. The most MDNR recent inspection occurred August 19, 2009 and no deficiencies were noted. Refer to Section 1.3.7 for further information regarding the inspection reports.

1.2.7 Size Classification

For the purposes of this EPA-mandated inspection, the size of the impoundments was based on U. S. Army Corps of Engineers (COE) criteria. Based on the maximum height of 32 feet and a storage volume of approximately 970 acre-feet, the Cells A-D Impoundment is classified as a **Small** sized structure. Based on the maximum height of 22 feet and a current storage volume of 380 acre-feet, the Cell E Impoundment is classified as a **Small** sized structure. According to guidelines established by the COE, dams with a storage volume less than 1,000 acre-feet and/or a height less than 40 feet are classified as Small sized structures.

The maximum height of the impoundments was based on information provided by Barr. Note that the Cell E Impoundment height of 22 feet did not include the four feet of vertical expansion allowed in the design.

1.2.8 Hazard Potential Classification

The MDNR Dam Safety Unit has not classified the Cells A-D impoundment under State of Minnesota Rule 6115.0340 and no longer regulates the impoundment. Under the EPA classification system, as presented on page 2 of the EPA check list (**Appendix C**) and Definitions section (**Appendix B**), it is GZA's opinion that the Cells A-D Impoundment would be considered as having a **Less-Than-Low** hazard potential. The hazard potential rating is based on no probable loss of human life or economic or environmental losses due to failure.

The Cell E Impoundment has been classified as a **Significant (Class II)** hazard potential structure by the MDNR Dam Safety Unit, in accordance with the hazard rating system defined in the State of Minnesota Rule 6115.0340. Under Minnesota Rule, Class II structures are defined as follows:

> *Class II. Possible health hazard or property loss of high-value property, damage to secondary highways, railroad or other public utilities, or limited direct or indirect economic loss to the public other than that described in Class III.*

Under the EPA classification system, as presented on page 2 of the EPA check list (**Appendix C**) and Definitions section (**Appendix B**), it is GZA's opinion that the Cell E Impoundment would be considered as having a **Significant** hazard potential. The hazard potential rating is based on no probable loss of human life due to failure, the potential environmental impacts and interruption of power generation due to a failure of the impoundment and subsequent loss of impoundment capacity. The area downstream of the dam is shown in **Figure 2**.

1.3 Pertinent Engineering Data

1.3.1 Drainage Area

Based on the original design documents and as estimated by GZA, the Cells A-D and Cell E Impoundments do not receive drainage from the surrounding areas.[4] The only water that enters the impoundments is from direct precipitation.

1.3.2 Reservoir

Based on information provided by Barr, the Cell E Impoundment has a surface area of 23.1 acres and a storage volume of 380 acre-feet at a pool elevation of 1,476 feet MSL. Approximately 10 to 12 acres of pool area was observed during the May 2010 inspection by Barr with the remaining area consisting of an ash delta. These estimates are consistent with observations made during GZA's September 2010 Site visit.

Based on GZA's estimates and water levels observed, the Cells A-D Impoundment had a surface area of approximately 97 acres and a maximum water storage volume of approximately 970 acre-feet at a pool elevation of 1450 feet MSL.[5] The pool elevation at the time of our Site visit was estimated to be 1440 feet MSL.

1.3.3 Discharges at the Impoundment Sites

Under normal operating conditions, no water is discharged from the impoundments. Precipitation that falls into the Cells A-D Impoundment evaporates or infiltrates into the ground. Water is pumped from the Cell E Impoundment and returned to the LEC for use in the air scrubbers and waste water treatment plant. Per the MDNR permitting requirements, the double composite liner allowed less than 500 gallons per acre per day of leakage when leak tested after construction.

1.3.4 General Elevations (feet – MSL)

Elevations were taken from design drawings, reports, and data provided by LEC. Elevations were based upon the USGS topographic map MSL vertical datum.

<u>Cells A-D Impoundment</u>	
A. Top of Embankment (Minimum)	1450 feet
B. Upstream Water at Time of Inspection	± 1440 feet
C. Downstream Tail Water at Time of Inspection	Not Applicable
<u>Cell E Impoundment</u>	
A. Top of Embankment (Minimum)	1479 feet
B. Upstream Water at Time of Inspection	1476 feet
C. Downstream Tail Water at Time of Inspection	Not Applicable

[4] Drainage area for Cell E Impoundment is based on the topographic map of the impoundment provided by Barr. Drainage area for the Cells A-D impoundment is based on visual observations of conditions at the time of our Site visit.

[5] Drainage area estimated using Google Earth software.

D. Maximum Pond Water Elevation[6] 1476 feet

1.3.5 Design and Construction Records and History

The LEC staff was unable to provide information as to the party responsible for design and construction of the Cells A-D Impoundment. However, based on the March 2009 information request response provided to the EPA, the impoundment was put into operation in the early 1960's. Cells C and D were decommissioned in 1964 and Cells A and B were decommissioned in October 2000.[7]

The Cell E Impoundment was designed by Barr and earthwork was conducted by Hoover Construction Company. Construction of the impoundment occurred in 1999 and 2000 and was supervised by a Minnesota Power Professional Engineer with oversite from Barr.

As built drawings of the Cell E Impoundment were provided to GZA by Barr. Typcial embankment cross section details have been reproduced herein as **Figure 3**. Based on the information, the original investigation and design of the impoundment included a contingency for future expansion of the impoundment by raising the height of the impoundment embankments by approximately 4 feet. The impoundment had not been expanded at the time of our inspection. Prior to original embankment construction, the Site was stripped and topsoil removed. The Site was graded using compacted random natural fill[8]. The liner was constructed on the fill and select sand was placed over the liner to enhance performance and protect the liner.

1.3.6 Operating Records

Operations records were provided to GZA by LEC. The Cell E Impoundment water elevation at midnight each day for the last year of operation was provided and is included in **Appendix D**. Based on conversations with LEC, visual observations of the Cell E Impoundment water level are made during the shift visits to the impoundment as detailed in the General Maintenance Plans, but were not generally recorded or documented.

1.3.7 Previous Inspection Reports

Visual inspections of the Cell E impoundment are conducted during each shift by trained LEC personnel but generally not documented. Visual inspections of the Cell E Impoundment are conducted by Barr on an annual basis. Copies of the inspection reports are provided to LEC and the MDNR. In addition, the MDNR – Dam Safety Unit began inspections of the Cell E Impoundment in 2009 and inspects the impoundment every 4 years.

The two most recent inspections of the impoundment by Barr were conducted on May 4, 2009 and on May 3, 2010. No significant deficiencies were noted by Barr in either report. A minor erosion feature was noted by Barr near the toe of the southeast downstream slope. Barr recommended continued maintenance and monitoring of the impoundment. GZA reviewed the

[6] Based on the decommissioned nature of the Cells A-D Impoundment, no maximum pond elevation is provided for the Cells A-D Impoundment.
[7] March 2009 response by ALLETE, Inc. to EPA CERCLA Section 104(e) Information Request for Surface Impoundments.
[8] Description of construction including "random natural fill" based on information provided by Barr.

most recent MDNR inspection report. As a result of the most recent MDNR inspection in August 2009, the hazard classification was modified from Class III (Low Hazard) to Class II (Significant Hazard) due to the current operating water level of the impoundment compared to the levels shortly after construction.

2.0 INSPECTION

2.1 Visual Inspection

The LEC impoundments were inspected on September 23 and 24, 2010 by Patrick J. Harrison, P.E., and Douglas P. Simon, P.E. (Wisconsin), of GZA GeoEnvironmental, Inc., accompanied by Thomas Radue, P.E of Barr and several representatives of Minnesota Power. The inspection was conducted over the course of two days. For both days, the weather was cloudy with occasional rain with temperatures in the 40°s to 50°s Fahrenheit. Photographs to document the current conditions of the impoundments were taken during the inspection and are included in **Appendix E**. At the time of the inspection, the water level in the Cell E Impoundment was approximately 1476 feet MSL, based on the electronic gage located on the pump house. The water level in the Cells A-D Impoundment were present at approximately 1440 feet MSL based on visual observation. Underwater areas were not inspected, as this level of investigation was beyond of GZA's scope of services. A copy of the EPA Checklist and a separate copy of the GZA inspection checklist are included in **Appendix C**.

With respect to our visual inspection, there was no evidence of prior releases, failures, or patchwork observed by GZA.

2.1.1 Cells A-D Impoundment General Findings

In general, the LEC Cells A-D Impoundment was found to be in **FAIR** condition. An overall Site plan showing the impoundments is provided as **Figure 2**. The location and orientation of photographs provided in **Appendix E** is shown on the Photo Plan in **Figure 6**.

Water was present in a portion of Cells B, C and D of the ponds at the time of our Site visit but was typically set back several hundred feet from the toe of the upstream slope of the perimeter embankments. There was no water ponding on the surface of the ash in Cell A of the impoundment despite rain falling during the inspection. Most of Cell A appeared to be filled within two feet of the top of embankment with ash. The ash delta appeared to extend into the southwest portion of Cell B where the separation embankment had been removed. The upstream slope of the impoundment had a slope of approximately 2.5H:1V.[9] The upstream slope was generally well vegetated with tall unmaintained grass. Trees were present in many areas of the perimeter embankment. In most areas, the impoundment was incised but where a downstream slope was present, the slope was approximately 3H:1V and vegetated with tall grasses and trees. There were no observed areas of sloughing or seepage or evidence of the embankments being overtopped.

[9] Based on visual estimation by GZA.

2.2.1 Cell E General Findings

In general, the Cell E Impoundment was found to be in **SATISFACTORY** condition. The specific concerns are identified in more detail in the sections below. An overall site plan showing the impoundments is provided as **Figure 2**. A site plan showing key features of the Cell E impoundment, including deficiencies observed during the current inspection, is provided as **Figure 4**. The location and orientation of photographs provided in **Appendix E** is shown on the Photo Plan in **Figure 5**.

2.2.2 Cell E Upstream Slope (Photos 1 through 14)

The water surface elevation at the time of inspection was at elevation 1476 feet MSL. Therefore, the lower portion of the upstream slope was underwater or covered by ash deltas and not visible. The upstream slope above the water was in good condition. Minor grass vegetation growth was present between riprap stones. No unusual movement or sloughing was observed in the slope.

2.2.3 Cell E Top of Impoundment (Photos 11, 15 through 21)

The top of the Cell E Impoundment had a gravel cover, with some grasses. The top of impoundment had occasional minor pot holes along the entire length from vehicular traffic. The alignment of the top of impoundment appeared generally level, with no depressions or irregularities observed. Based on information provided by Barr, the top of impoundment elevation ranged from elevation 1479 feet to elevation 1483 feet MSL. No significant settlement was observed at the time of our inspection. There was approximately 3 feet of free board at the time of our inspection.

2.2.4 Cell E Downstream Slope (Photos 22 through 35)

The downstream slope of the impoundment was generally in good condition. The surface cover of the slope was grassed but had not been recently mowed. A minor erosion rill was observed along the toe of the eastern embankment as shown in Photo No. 34 and Photo No. 35. The rill was noted in the 2009 and 2010 inspections completed by Barr as being vegetated and apparently stable. Two 2-inch diameter trees/shrubs were observed on the toe at the northwest corner of the impoundment as shown in Photo No. 27. No unusual movement or sloughing was observed in the slope. A gravel access road was present along the toe of the downstream slope on the northern portion of the impoundment. The access road was in good condition, with minor rutting on the surface. No seepage or sloughing was observed on the downstream slope.

2.2.5 Cell E Pump House and Ash Discharge Pipes (Photos 22 through 35)

The pump house and ash discharge pipes were generally in good condition. There were no leaks observed in the discharge pipes and the pump house appeared to be in good repair. There were no observed defects or areas of these structures that required repair.

2.2 Caretaker Interview

Maintenance of the impoundments is the responsibility of LEC personnel. GZA met with LEC personnel and discussed the operations and maintenance procedures, regulatory requirements, and the history of the impoundments since their construction.

2.3 Operation and Maintenance Procedures

As discussed in Section 1.2.5, LEC personnel are responsible for the regular operations and maintenance of the impoundments. A General Maintenance Plan is in place for the Cell E Impoundment. Routine maintenance procedures for the Cell E Impoundment include an annual vegetative maintenance program, consisting of the removal of deep-rooted vegetation from the embankment and application of herbicides. Routine operations of the Cell E Impoundment include the daily inspection of the impoundment, periodic inspection and rotation of discharge pipes, and annual inspection by a consulting engineer. Position and elevation readings of the survey monuments are taken on an annual basis.

2.4 Emergency Action Plan

An Emergency Action Plan (EAP) was developed for the impoundments on October 6, 2010 by Barr. The EAP included a description of potential emergency situations at the impoundment, emergency remedial actions and a description of available emergency resources. The EAP does not provide information about the potential impoundment break inundation areas, but mentions that such information had been developed and was on file with Minnesota Power Emergency Response personnel. Note that the hazard potential classification for the dam is discussed in Section 1.2.8.

2.5 Hydrologic/Hydraulic Data

Based on information provided by Barr, the capacity of the Cell E impoundment was evaluated relative to the 6-hour Probable Maximum Precipitation (PMP). The 6-hour PMP is reportedly the most conservative event required by Minnesota Law. Barr's analysis indicated that the 6-hour PMP event could result in a 28.5 inch rise in water levels in the Cell E Impoundment. The free board in the Cell E impoundment is currently maintained at 36 inches and will be maintained at 30 inches if vertical expansion is commenced. Therefore, Barr deemed the freeboard of the current and proposed design adequate.

GZA did not perform an independent assessment of the hydraulics and hydrology for the impoundments as this was beyond our scope of services. .

2.6 Structural and Seepage Stability

No engineering design information was provided for the Cells A-D Impoundment. Based on information provided by Barr, the proposed vertical expansion of the Cell E impoundment includes steepening portions of the downstream and upstream slopes. Portions of the downstream slope would be altered from a 3H:1V slope to a 2.5H:1V slope and portions of the upstream slope would be altered from a 4H:1V slope to a 2H:1V slope. The resulting slopes after vertical expansion would result in a less conservative design than the current structure. Barr's analysis indicated the minimum slope stability factor of safety for drained shear strength

conditions is 1.5. This factor of safety reportedly exceeds the minimum required value. Barr deemed it unnecessary to examine the undrained shear strength and liquefied shear strength due to the nature of the construction and operation of the Cell E Impoundment.

GZA did not perform an independent assessment of the structural and seepage stability for the impoundments as this was beyond our scope of services.

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

In general, the overall condition of Cell E Impoundment was judged to be **SATISFACTORY**. The Cell E impoundment was found to have the following deficiencies:

1. Minor erosion along the down slope toe of the east embankment;
2. Minor potholes along the crest gravel access road; and,
3. Presence of trees at the down slope toe of the northwest corner of the embankment.

In general, if the Cells A-D Impoundment were rated as an active impoundment, the overall condition of would be judged to be **FAIR**. The impoundment was found to have the following deficiencies of an active impoundment:

1. Presence of trees on the upstream embankment and top of impoundment;
2. Potholes and rutting of the crest access road; and,
3. No monitoring, maintenance or emergency action plan for the Cells A-D Impoundment.

The following recommendations and remedial measures generally describe the recommended approach to address current deficiencies at the impoundments. Prior to undertaking recommended maintenance, repairs, or remedial measures, the applicability of environmental permits needs to be determined for activities that may occur within resource areas under the jurisdiction of the appropriate regulatory agencies.

3.2 Studies and Analyses

GZA recommends that LEC evaluate the stability and flowability of the ash contained within the Cells A-D Impoundment.

3.3 Recurrent Operation & Maintenance Recommendations

GZA recommends the following operation and maintenance level activities:

1. Increased mowing of the grasses on the embankments to facilitate daily inspections and reduce the risk of burrowing animals;
2. Repair the potholes present in the gravel crest access road. Grade the road to provide better drainage and reduce future potholing;
3. Clear deep rooted vegetation from embankments and top of impoundments;
4. Document impoundment inspections conducted by facility personnel each shift; and,

5. Extend monitoring, maintenance and emergency action plans to include the Cells A-D Impoundment.

3.4 Repair Recommendations

GZA recommends the following minor repairs which may improve the overall condition of the impoundment, but do not alter the current design. The recommendations may require design by a professional engineer and construction contractor experienced in impoundment construction.

1. Repair rutting present on the Cells A-D Impoundment crest access road.

3.5 Alternatives

There are no practical alternatives to the repairs itemized above.

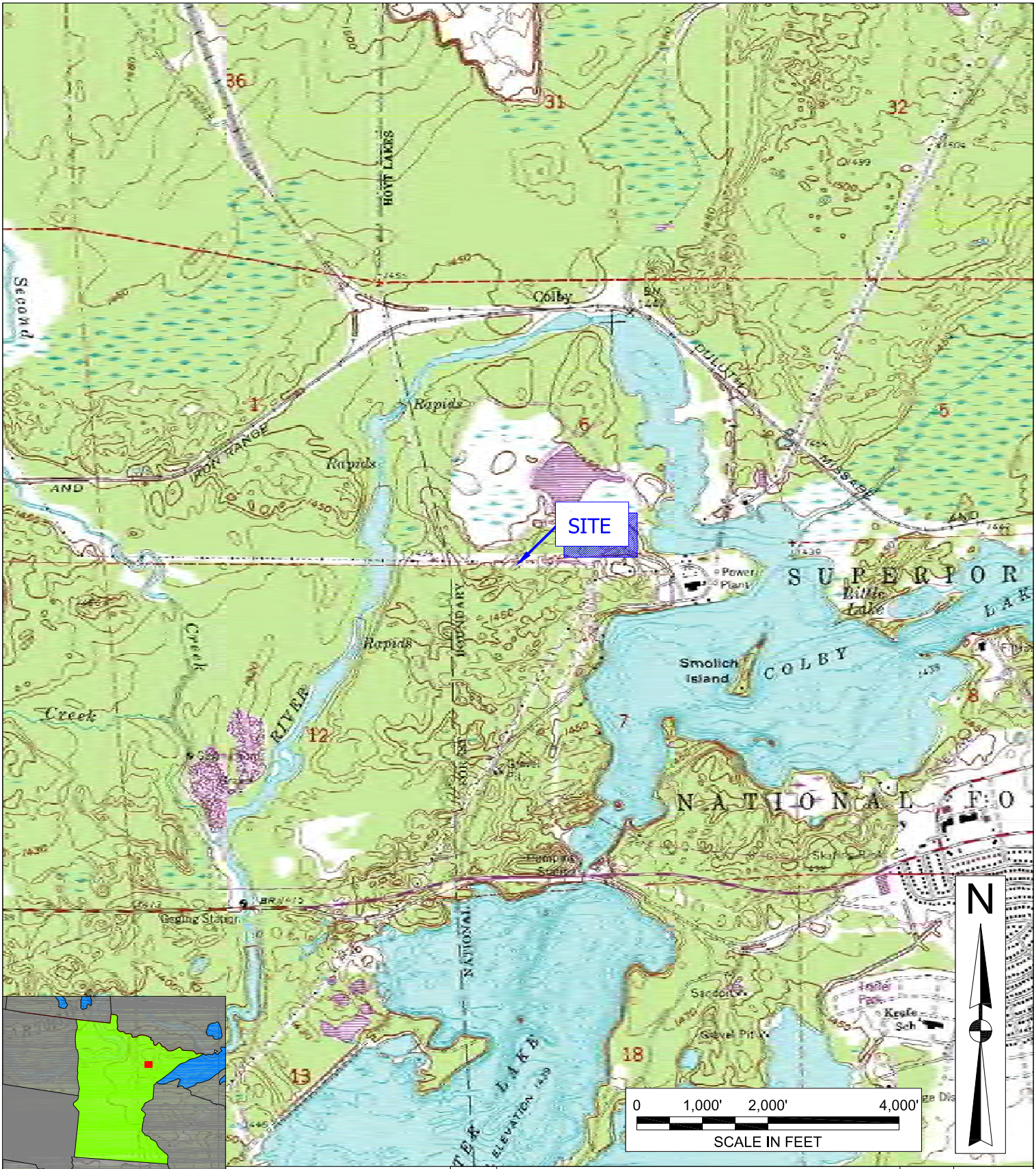
4.0 ENGINEER'S CERTIFICATION

I acknowledge that the management unit referenced herein, the LEC Cell E Impoundment has been assessed to be in **SATISFACTORY** condition and the Cells A-D Impoundment has been assessed to be in **FAIR** condition on September 24, 2010.

Patrick J. Harrison, P.E.
Senior Consultant

J:\01.xx Norwood\01.0170142.20 CCW Dams Round 7\Task 5 CLIN 023 Allete Laskin Energy Center MN\Final Report 111810\Laskin Energy Center Report 111810 Final.doc

Figures



SOURCE: U.S.G.S. AURORA, MINN. QUADRANGLE MAP (1962) PHOTOREVISED (1984)

NO.	ISSUE/DESCRIPTION	BY	DATE

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2560

PREPARED FOR:

SITE LOCATION MAP

AURORA, MINNESOTA

FIGURE 1

PROJ MGR:	REVIEWED BY:	CHECKED BY:	DATE	PROJECT NO.	REVISION NO.
DESIGNED BY:	DRAWN BY:	SCALE: 1 : 24000			

SHEET NO.

1A1B
2
(CELL B)
(CELL C)
3
CELLS A-D
(CELL A)
(CELL D)
5
MP 2
MP 1
4A4B
MP 4
MP 3
CELL E
13
614
8
9
10
11
LASKIN ENERGY CENTER

LEGEND

- APPROXIMATE IMPOUNDMENT BOUNDARY
- APPROXIMATE DOWNSTREAM AREA FROM IMPOUNDMENT CELL
- 4A4B GROUNDWATER MONITORING WELL LOCATIONS
- MP-4 SETTLEMENT MARKERS

NOTES

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE DATED JUNE 3RD 2009. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS PUBLISHED BY THE U.S.D.A. IN 2010.
2. THE LINE OF THE APPROXIMATE DOWNSTREAM AREA FROM THE IMPOUNDMENT CELL WAS DETERMINED THROUGH USE OF THE USGS QUADRANGLE MAP: AURORA, MINN. DATED 1962, PHOTOREVISED 1984.
3. SETTLEMENT MARKERS WERE APPROXIMATELY LOCATED THROUGH USE OF THE SURVEY TITLED "LASKIN ASH POND MONITORS," CONDUCTED BY K. BUSCHE AND R. GAFFHE ON 5/28/10.

N

0 300' 600' 1200'

APPROXIMATE SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

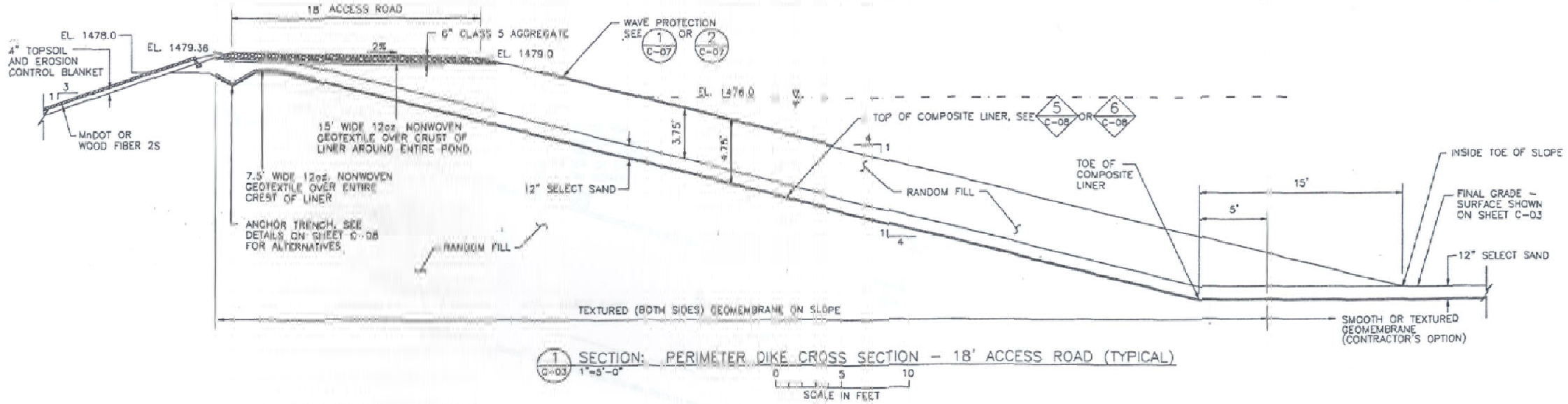
SITE PLAN

LASKIN ENERGY CENTER
5699 COLBY LAKE ROAD
HOYTS LAKE

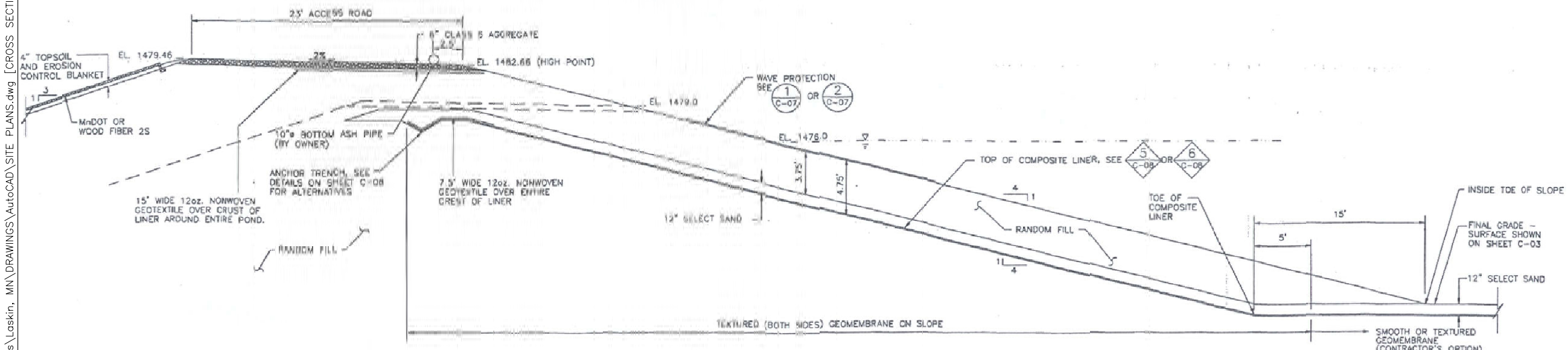
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2560

PREPARED FOR: US EPA

PROJ MGR: DPS	REVIEWED BY: DPS	CHECKED BY: DPS	FIGURE 2
DESIGNED BY: DPS	DRAWN BY: JAH	SCALE:	
DATE 10/13/10	PROJECT NO.	REVISION NO.	SHEET NO.



1 C-03 SECTION: PERIMETER DIKE CROSS SECTION - 18' ACCESS ROAD (TYPICAL)
1"=5'-0"
0 5 10
SCALE IN FEET



2 C-03 SECTION: PERIMETER DIKE CROSS SECTION - 23' ACCESS ROAD
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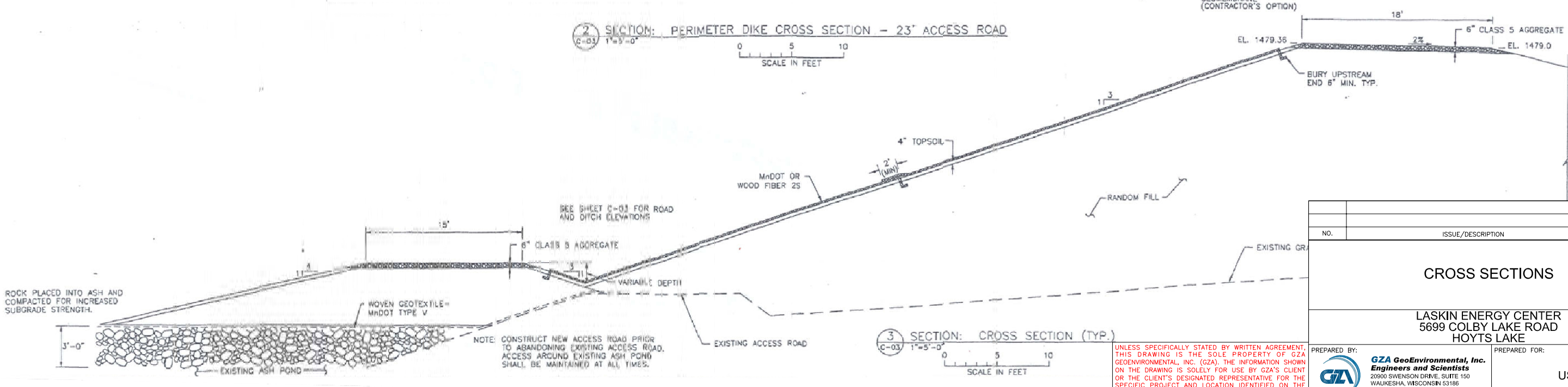
SCALE IN FEET



3 C-03 SECTION: CROSS SECTION (TYP.)
1"=5'-0"
0 5 10
SCALE IN FEET

NOTES

1. FIGURE DEVELOPED FROM THE DRAWING TITLED "PERIMETER DIKE SECTIONS," DRAWING NUMBER C-06, REVISION NUMBER 1, OF THE PLAN SET TITLED "HORIZONTAL ASH POND EXPANSION, LASKIN ENERGY CENTER - HOYT LAKES, MINNESOTA," CREATED BY BARR ENGINEERING COMPANY, DATED 1/26/99.

NO.	ISSUE/DESCRIPTION	BY	DATE

CROSS SECTIONS

LASKIN ENERGY CENTER
5699 COLBY LAKE ROAD
HOYTS LAKE

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2560

PREPARED FOR: US EPA

PROJ MGR:	DPS	REVIEWED BY:	DPS	CHECKED BY:	DPS
DESIGNED BY:	DPS	DRAWN BY:	JAH	SCALE:	
DATE 10/13/10		PROJECT NO.		REVISION NO.	

FIGURE 3
SHEET NO.

LEGEND

- APPROXIMATE IMPOUNDMENT BOUNDARY
- APPROXIMATE DOWNSTREAM AREA FROM IMPOUNDMENT CELL
- 4A4B — GROUNDWATER MONITORING WELL LOCATIONS
- MP-4 — SETTLEMENT MARKERS

NOTES

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE DATED JUNE 3RD 2009. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS PUBLISHED BY THE U.S.D.A. IN 2010.
2. THE LINE OF THE APPROXIMATE DOWNSTREAM AREA FROM THE IMPOUNDMENT CELL WAS DETERMINED THROUGH USE OF THE USGS QUADRANGLE MAP: AURORA, MINN. DATED 1962, PHOTOREVISED 1984.
3. SETTLEMENT MARKERS WERE APPROXIMATELY LOCATED THROUGH USE OF THE SURVEY TITLED "LASKIN ASH POND MONITORS," CONDUCTED BY K. BUSCHE AND R. GAFFHE ON 5/28/10.

N

0 100' 200' 400'

APPROXIMATE SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

CELL E IMPOUNDMENT

LASKIN ENERGY CENTER
5699 COLBY LAKE ROAD
HOYTS LAKE

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2560

PREPARED FOR: US EPA

PROJ MGR: DPS	REVIEWED BY: DPS	CHECKED BY: DPS	FIGURE
DESIGNED BY: DPS	DRAWN BY: JAH	SCALE:	4
DATE 10/14/10	PROJECT NO.	REVISION NO.	SHEET NO.

LEGEND

12 GZA PHOTO LOCATION/DIRECTION

NOTES

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE DATED JUNE 3RD 2009. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS PUBLISHED BY THE U.S.D.A. IN 2010.

N

0 100' 200' 400'

APPROXIMATE SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

IMPOUNDMENT CELL E
PHOTO PLAN

LASKIN ENERGY CENTER
5699 COLBY LAKE ROAD
HOYTS LAKE

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2560

PREPARED FOR: US EPA

PROJ MGR:	DPS	REVIEWED BY:	DPS	CHECKED BY:	DPS	FIGURE	
DESIGNED BY:	DPS	DRAWN BY:	JAH	SCALE:		5	
DATE	10/14/10	PROJECT NO.		REVISION NO.		SHEET NO.	

LEGEND

- APPROXIMATE IMPOUNDMENT BOUNDARY
- APPROXIMATE DOWNSTREAM AREA FROM IMPOUNDMENT CELL
- 3 GROUNDWATER MONITORING WELL LOCATIONS

NOTES

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE DATED JUNE 3RD 2009. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS PUBLISHED BY THE U.S.D.A. IN 2010.
2. THE LINE OF THE APPROXIMATE DOWNSTREAM AREA FROM THE IMPOUNDMENT CELL WAS DETERMINED THROUGH USE OF THE USGS QUADRANGLE MAP: AURORA, MINN. DATED 1962, PHOTOREVISED 1984.

N

0 250' 500'

APPROXIMATE SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

CELLS A-D IMPOUNDMENTS

LASKIN ENERGY CENTER
5699 COLBY LAKE ROAD
HOYTS LAKE

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2560

PREPARED FOR: US EPA

PROJ MGR:	DPS	REVIEWED BY:	DPS	CHECKED BY:	DPS
DESIGNED BY:	DPS	DRAWN BY:	JAH	SCALE:	
DATE	10/13/10	PROJECT NO.		REVISION NO.	

FIGURE 6
SHEET NO.

Appendix A

Limitations

DAM ENGINEERING & VISUAL INSPECTION LIMITATIONS

1. The observations described in this report were made under the conditions stated herein. The conclusions presented in the report were based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of described services.

2. In preparing this report, GZA GeoEnvironmental, Inc. (GZA) has relied on certain information provided by ALLETE, Inc (and their affiliates) as well as Federal, state, and local officials and other parties referenced therein. GZA has also relied on other parties which were available to GZA at the time of the inspection. Although there may have been some degree of overlap in the information provided by these various sources, GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this work.

3. In reviewing this Report, it should be noted that the reported condition of the dam is based on observations of field conditions during the course of this study along with data made available to GZA. The observations of conditions at the dam reflect only the situation present at the specific moment in time the observations were made, under the specific conditions present. It may be necessary to reevaluate the recommendations of this report when subsequent phases of evaluation or repair and improvement provide more data.

4. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions may be detected.

5. Water level readings have been reviewed and interpretations have been made in the text of this report. Fluctuations in the level of the groundwater and surface water may occur due to variations in rainfall, temperature, and other factors different than at the time measurements were made.

6. GZA's comments on the hydrology, hydraulics, and embankment stability for the dam are based on a limited review of available design documentation prepared by Barr Engineering for ALLETE, Inc. Calculations and computer modeling used by Barr Engineering in these analyses were not available and were not independently reviewed by GZA.

7. This report has been prepared for the exclusive use of US EPA for specific application to the existing dam facilities, in accordance with generally accepted dam engineering practices. No other warranty, express or implied, is made.

8. This dam inspection verification report has been prepared for this project by GZA. This report is for broad evaluation and management purposes only and is not sufficient, in and of itself, to prepare construction documents or an accurate bid.

Appendix B

Definitions

COMMON DAM SAFETY DEFINITIONS

For a comprehensive list of dam engineering terminology and definitions refer to references published by the U.S. Army Corps of Engineers, the Federal Energy Regulatory Commission, the Department of the Interior Bureau of Reclamation, or the Federal Emergency Management Agency.

Orientation

Upstream – Shall mean the side of the dam that borders the impoundment.

Downstream – Shall mean the high side of the dam, the side opposite the upstream side.

Right – Shall mean the area to the right when looking in the downstream direction.

Left – Shall mean the area to the left when looking in the downstream direction.

Dam Components

Dam – Shall mean any artificial barrier, including appurtenant works, which impounds or diverts water.

Embankment – Shall mean the fill material, usually earth or rock, placed with sloping sides, such that it forms a permanent barrier that impounds water.

Crest – Shall mean the top of the dam, usually provides a road or path across the dam.

Abutment – Shall mean that part of a valley side against which a dam is constructed. An artificial abutment is sometimes constructed as a concrete gravity section, to take the thrust of an arch dam where there is no suitable natural abutment.

Appurtenant Works – Shall mean structures, either in dams or separate there from, including but not be limited to, spillways; reservoirs and their rims; low level outlet works; and water conduits including tunnels, pipelines, or penstocks, either through the dams or their abutments.

Spillway – Shall mean a structure over or through which water flows are discharged. If the flow is controlled by gates or boards, it is a controlled spillway; if the fixed elevation of the spillway crest controls the level of the impoundment, it is an uncontrolled spillway.

General

EAP – Emergency Action Plan - Shall mean a predetermined plan of action to be taken to reduce the potential for property damage and/or loss of life in an area affected by an impending dam break.

O&M Manual – Operations and Maintenance Manual; Document identifying routine maintenance and operational procedures under normal and storm conditions.

Normal Pool – Shall mean the elevation of the impoundment during normal operating conditions.

Acre-foot – Shall mean a unit of volumetric measure that would cover one acre to a depth of one foot. It is equal to 43,560 cubic feet. One million U.S. gallons = 3.068 acre feet.

Height of Dam – Shall mean the vertical distance from the lowest portion of the natural ground, including any stream channel, along the downstream toe of the dam to the crest of the dam.

Spillway Design Flood (SDF) – Shall mean the flood used in the design of a dam and its appurtenant works particularly for sizing the spillway and outlet works, and for determining maximum temporary storage and height of dam requirements.

Condition Rating

SATISFACTORY - No existing or potential management unit safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable criteria. Minor maintenance items may be required.

FAIR - Acceptable performance is expected under all required loading conditions (static, hydrologic, seismic) in accordance with the applicable safety regulatory criteria. Minor deficiencies may exist that require remedial action and/or secondary studies or investigations.

POOR - A management unit safety deficiency is recognized for any required loading condition (static, hydrologic, seismic) in accordance with the applicable dam safety regulatory criteria. Remedial action is necessary. POOR also applies when further critical studies or investigations are needed to identify any potential dam safety deficiencies.

UNSATISFACTORY - Considered unsafe. A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Reservoir restrictions may be necessary.

Hazard Potential

(In the event the impoundment should fail, the following would occur):

LESS THAN LOW HAZARD POTENTIAL: Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

LOW HAZARD POTENTIAL: Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

SIGNIFICANT HAZARD POTENTIAL: Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

HIGH HAZARD POTENTIAL: Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

Appendix C

Inspection Checklists

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Laskin Energy Center	Date:	September 23, 2010
Unit Name:	Cells A-D	Operator's Name:	Allete Inc. dba Minnesota Power
Unit I.D.:		Hazard Potential Classification:	High Significant (Low)
Inspector's Name:	Doug Simon and Patrick Harris, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Annual		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	Unknown		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	Unknown		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	N/A		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?		✓	From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?	N/A		"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?	N/A		Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?	N/A		23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

9) There are trees growing throughout the impoundment. The largest noted tree was approximately 4 inches in diameter.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # MN000990 INSPECTOR Patrick Harrison, P.E.
Doug Simon

Date 9/23/10

Impoundment Name Cells A-D
Impoundment Company Allete Inc., dba Minnesota Power
EPA Region Region V
State Agency (Field Office) Addresss 500 Lafayette Road
St. Paul, MN 55155-4040
Name of Impoundment Cells A-D
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update X

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X

IMPOUNDMENT FUNCTION: Inactive Pond, Storage of CCW

Nearest Downstream Town : Name No Towns Downstream Within 10 Miles
Distance from the impoundment _____
Impoundment
Location: Longitude 47 Degrees 32 Minutes 8 Seconds
Latitude 92 Degrees 10 Minutes 19 Seconds
State MN County St. Louis

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency?_____

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_x_ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

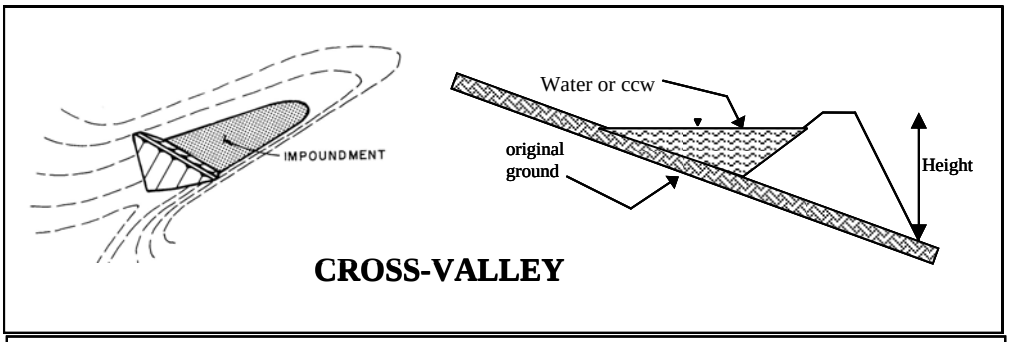
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

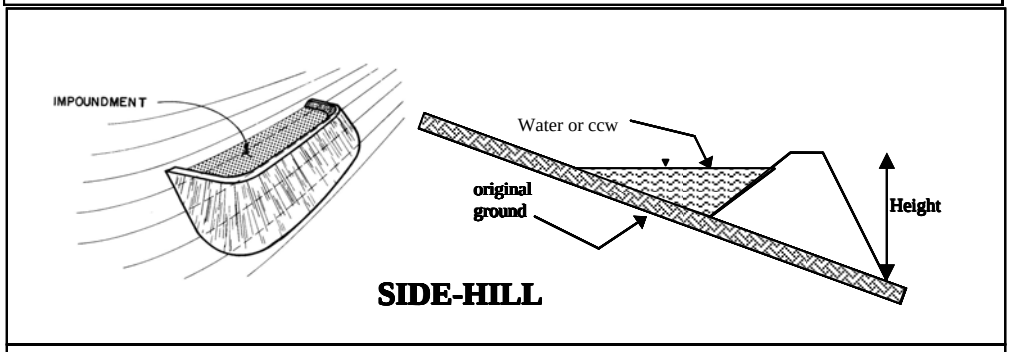
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

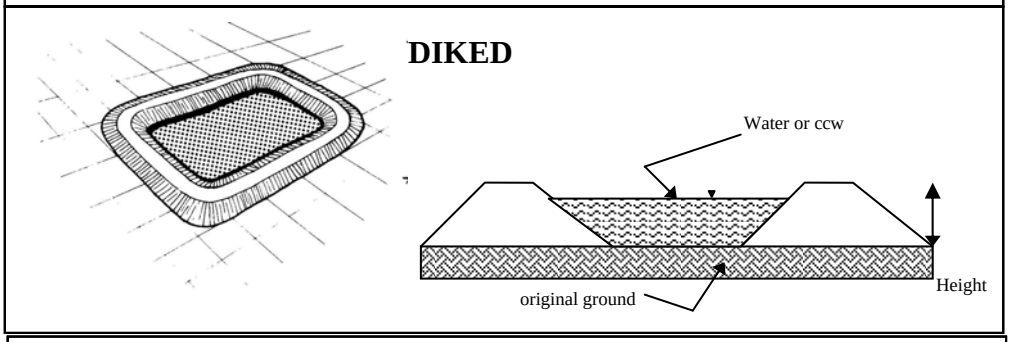
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

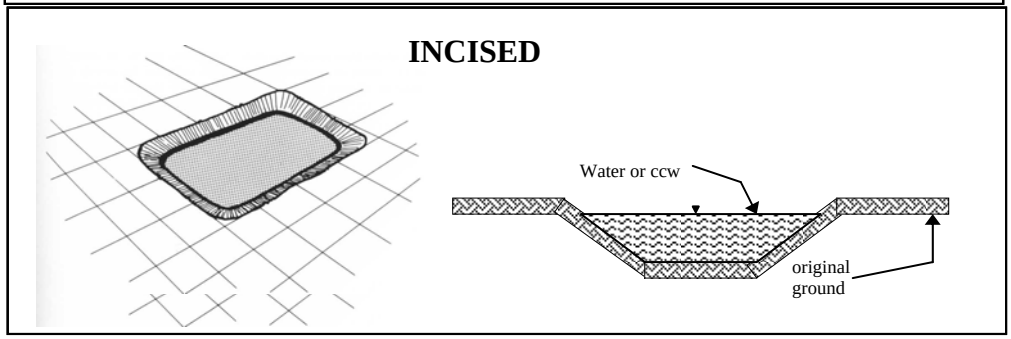
The impoundment has been inactive for several years and the only water entering the impoundment is from rain water falling directly on the impoundment. The ponded water is generally several hundred feet from the embankments. The impoundment is generally incised; dikes, where present, are generally less than 9 feet tall.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_X_____ Combination Incised/Diked

Embankment Height _9_____ feet
Pool Area _Approximately 5_____ acres
Current Freeboard _Approx. 8 to 10_ feet

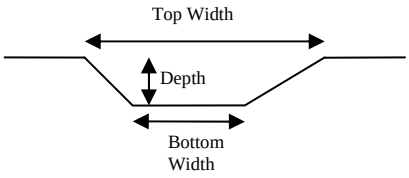
Embankment Material _Native, Silty Sand_
Liner _None Reported or Observed_____
Liner Permeability _Unknown_____

TYPE OF OUTLET (Mark all that apply)

NA **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width

TRAPEZOIDAL



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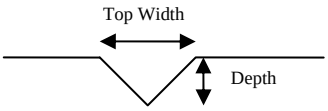
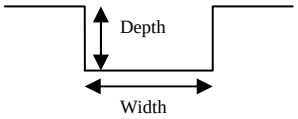
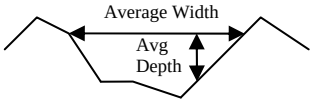


RECTANGULAR

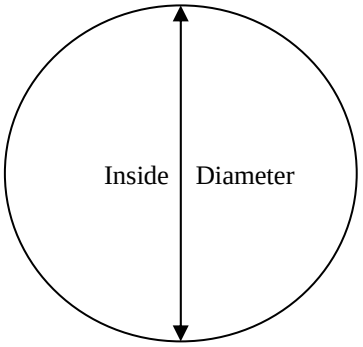


IRREGULAR



NA **Outlet**

_____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO _____ (NA)

X **No Outlet**

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Unknown

Has there ever been a failure at this site? YES _____ NO _x_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO _X_____

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO _x_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

DAM SAFETY INSPECTION CHECKLIST

NAME OF DAM: Cells A-D

STATE ID #: MN0000990

REGISTERED: ☐ YES ☑ NO

NID ID #:

STATE SIZE CLASSIFICATION: Small

STATE HAZARD CLASSIFICATION: Low

CHANGE IN HAZARD CLASSIFICATION REQUESTED?:

DAM LOCATION INFORMATION

CITY/TOWN: City of Hoyt Lakes

COUNTY: St. Louis, Minnesota

DAM LOCATION: 5699 Colby Lake Road, Hoyt Lakes, Minnesota
(street address if known)

ALTERNATE DAM NAME:

USGS QUAD.: Aurora, Minn Revised (1984)

LAT.:

LONG.:

DRAINAGE BASIN:

RIVER: N/A

IMPOUNDMENT NAME(S): Cells A-D

GENERAL DAM INFORMATION

TYPE OF DAM: Incised and bermed Ash Impoundments

OVERALL LENGTH (FT): 8900

PURPOSE OF DAM: Ash Impoundment

NORMAL POOL STORAGE (ACRE-FT): 20 (Estimated)

YEAR BUILT: 1960's

MAXIMUM POOL STORAGE (ACRE-FT): 970

STRUCTURAL HEIGHT (FT): 1479

EL. NORMAL POOL (FT): 1440.0

HYDRAULIC HEIGHT (FT): 6

EL. MAXIMUM POOL (FT): 1450.0

☐ YES ☐ NO ☐ YES ☐ NO

NAME OF DAM: Cells A-D | STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 | NID ID #: 0

INSPECTION SUMMARY

DATE OF INSPECTION: September 23, 2010 | DATE OF PREVIOUS INSPECTION: May 1, 2010

TEMPERATURE/WEATHER: Rainy, 50 degrees F. | ARMY CORPS PHASE I: ☐ YES ☑ NO | If YES, date

CONSULTANT: GZA GeoEnvironmental, Inc | PREVIOUS DCR PHASE I: ☐ YES ☑ NO | If YES, date

BENCHMARK/DATUM: Mean Sea Level

OVERALL PHYSICAL CONDITION OF DAM: POOR | DATE OF LAST REHABILITATION: N/A

SPILLWAY CAPACITY: 0-50% of the SDF or Unknown

EL. POOL DURING INSP.: 1476 | EL. TAILWATER DURING INSP.: N/A

PERSONS PRESENT AT INSPECTION

NAME	TITLE/POSITION	REPRESENTING
Lainie Plotnik	Operations Manager	Allete Inc., dba Minnesota Power
Mark Scharnott	Mechanical Engineer	Allete Inc., dba Minnesota Power
Blake Francis	Supervisor, Water Quality	Allete Inc., dba Minnesota Power
Thomas Radue	Senior Geotechnical Engineer	Barr Engineering Company
Doug Simon	Geological Engineering	GZA GeoEnvironmental, Inc
Patrick Harrison, P.E.	Senior Geotechnical Eng.	GZA GeoEnvironmental, Inc

EVALUATION INFORMATION

	Click on box to select E-code		Click on box to select E-code
E1) TYPE OF DESIGN	1	E8) LOW-LEVEL OUTLET CONDITION	
E2) LEVEL OF MAINTENANCE	2	E9) SPILLWAY DESIGN FLOOD CAPACITY	1
E3) EMERGENCY ACTION PLAN	5	E10) OVERALL PHYSICAL CONDITION	2
E4) EMBANKMENT SEEPAGE	5	E11) ESTIMATED REPAIR COST	
E5) EMBANKMENT CONDITION	2	ROADWAY OVER CREST	NO
E6) CONCRETE CONDITION	N/A	BRIDGE NEAR DAM	NO
E7) LOW-LEVEL OUTLET CAPACITY	1		

NAME OF INSPECTING ENGINEER: Patrick Harrison, P.E.; Doug Simon | SIGNATURE:

NAME OF DAM: Cells A-D

STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010

NID ID #: 0

OWNER:		CARETAKER:	
ORGANIZATION	Allete Inc., dba Minnesota Power	ORGANIZATION	Allete Inc., dba Minnesota Power
NAME/TITLE		NAME/TITLE	Lainie Plotnik, Thermal Business Operations
STREET	30 West Superior Street	STREET	5699 Colby Lake Road
TOWN, STATE, ZIP	Duluth, MN 55802	TOWN, STATE, ZIP	Hoyt Lakes, MN 55750
PHONE	(218)722-5642	PHONE	(218)225-4801
EMERGENCY PH. #	(218)225-4808	EMERGENCY PH. #	(218)225-4808
FAX		FAX	(218)225-2425
EMAIL		EMAIL	lplotnik@mnpower.com
OWNER TYPE	Private		

PRIMARY SPILLWAY TYPE: None Present, water Piped back to facility

SPILLWAY LENGTH (FT): N/A

SPILLWAY CAPACITY (CFS): N/A

AUXILIARY SPILLWAY TYPE: N/A

AUX. SPILLWAY CAPACITY (CFS): N/A

NUMBER OF OUTLETS: None Present

OUTLET(S) CAPACITY (CFS): N/A

TYPE OF OUTLETS: N/A

TOTAL DISCHARGE CAPACITY (CFS): N/A

DRAINAGE AREA (SQ MI): None outside impoundment

SPILLWAY DESIGN FLOOD (PERIOD/CFS): N/A

HAS DAM BEEN BREACHED OR OVERTOPPED ☐ YES ☑ NO IF YES, PROVIDE DATE(S)

FISH LADDER (LIST TYPE IF PRESENT): N/A

DOES CREST SUPPORT PUBLIC ROAD? ☐ YES ☑ NO IF YES, ROAD NAME:

PUBLIC BRIDGE WITHIN 50' OF DAM? ☐ YES ☑ NO IF YES, ROAD/BRIDGE NAME:

MHD BRIDGE NO. (IF APPLICABLE)

NAME OF DAM: Cells A-D STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 NID ID #: 0

EMBANKMENT (CREST)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
CREST	1. SURFACE TYPE	Degraded Gravel Road			X
	2. SURFACE CRACKING	None Observed	x		
	3. SINKHOLES, ANIMAL BURROWS	None Observed	x		
	4. VERTICAL ALIGNMENT (DEPRESSIONS)	No depressions Observed	x		
	5. HORIZONTAL ALIGNMENT	No problems observed	x		
	6. RUTS AND/OR PUDDLES	Some potholes and rutting			X
	7. VEGETATION (PRESENCE/CONDITION)	Trees up to 8 inches in diameter			X
	8. ABUTMENT CONTACT	N/A	x		

ADDITIONAL COMMENTS: Potholes and rutting in gravel access road should be repaired and regraded.
Trees should be removed.

NAME OF DAM: Cells A-D STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 NID ID #: 0

EMBANKMENT (D/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
D/S SLOPE	1. WET AREAS (NO FLOW)	None Observed	x		
	2. SEEPAGE	None Observed	x		
	3. SLIDE, SLOUGH, SCARP	None Observed	x		
	4. EMB.-ABUTMENT CONTACT	N/A	x		
	5. SINKHOLE/ANIMAL BURROWS	None Observed	x		
	6. EROSION	None Observed	x		
	7. UNUSUAL MOVEMENT	None Observed	x		
	8. VEGETATION (PRESENCE/CONDITION)	Thick, unmowed grass covered most of the embankment			x

ADDITIONAL COMMENTS:

Grass should be mowed to deter animal burrowing.

NAME OF DAM: Cells A-D STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 NID ID #: 0

EMBANKMENT (U/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
U/S SLOPE	1. SLIDE, SLOUGH, SCARP	None observed	x		
	2. SLOPE PROTECTION TYPE AND COND.	None observed	x		
	3. SINKHOLE/ANIMAL BURROWS	None observed	x		
	4. EMB.-ABUTMENT CONTACT	N/A	x		
	5. EROSION	None observed	x		
	6. UNUSUAL MOVEMENT	None observed	x		
	7. VEGETATION (PRESENCE/CONDITION)	Unmaintained grass and trees up to 8 inches in diameter			x

ADDITIONAL COMMENTS:

NAME OF DAM: Cells A-D STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 NID ID #: 0

INSTRUMENTATION

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
INSTR.	1. PIEZOMETERS	None present	x		
	2. OBSERVATION WELLS	Three wells used for water quality testing on the embankment.	x		
	3. STAFF GAGE AND RECORDER	None present	x		
	4. WEIRS	None Present	x		
	5. INCLINOMETERS	None Present	x		
	6. SURVEY MONUMENTS	None present	x		
	7. DRAINS	None Present	x		
	8. FREQUENCY OF READINGS	No measurements are taken	x		
	9. LOCATION OF READINGS		x		

ADDITIONAL COMMENTS:

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Laskin Energy Center	Date:	September 23, 2010
Unit Name:	Cell E	Operator's Name:	Allete Inc. dba Minnesota Power
Unit I.D.:		Hazard Potential Classification:	High **Significant** Low
Inspector's Name:	Doug Simon and Patrick Harris, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily/Annual		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	1,476.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	1,479.0		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?	N/A	
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?	N/A		23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1) Daily visual observations performed by plant personnel, annual safety inspections performed by consultant engineer. State agency performs inspections every 4 years.
2) Pool elevations are continuously monitored with electronic equipment and visually monitored daily by plant personnel from a staff gauge.
9) Two trees about 1 to 2 inches in diameter were noted at toe of downstream embankment near the northwest corner of the impoundment.
11) Four settlement monitors were located along the northern portion of the impoundment. Monitors are measured annually starting in April 2010.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # MN000990 INSPECTOR Patrick Harrison, P.E.
Doug Simon

Date 9/23/10

Impoundment Name Cell E
Impoundment Company Allete Inc., dba Minnesota Power
EPA Region Region V
State Agency (Field Office) Addresss 500 Lafayette Road
St. Paul, MN 55155-4040
Name of Impoundment Cell E
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update X

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	X	_____

IMPOUNDMENT FUNCTION: CCW Settling Pond

Nearest Downstream Town : Name No Towns Downstream Within 10 Miles
Distance from the impoundment _____
Impoundment Location: Longitude 47 Degrees 31 Minutes 54 Seconds
Latitude 92 Degrees 10 Minutes 17 Seconds
State MN County St. Louis

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? Minnesota Department of Natural Resources, Dam Safety Program

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

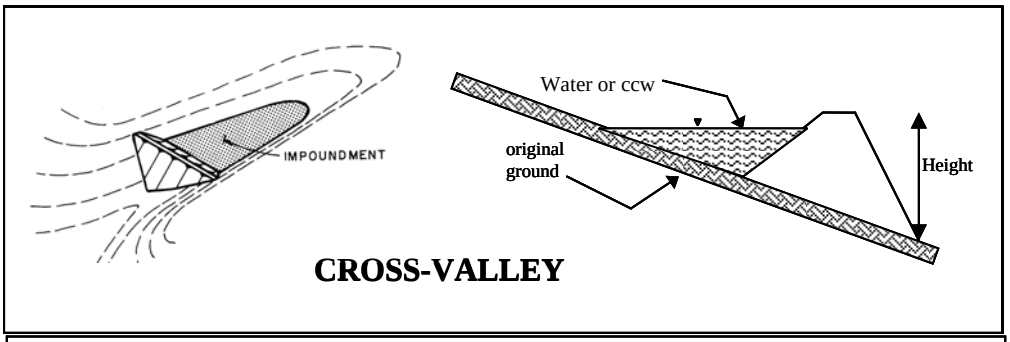
_X_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

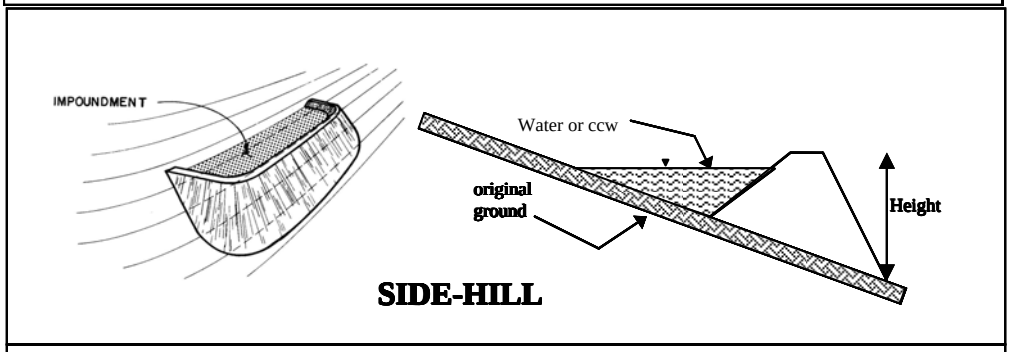
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

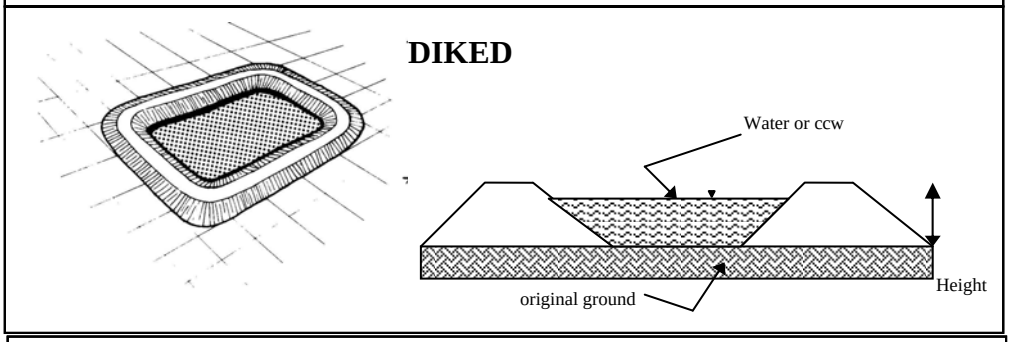
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

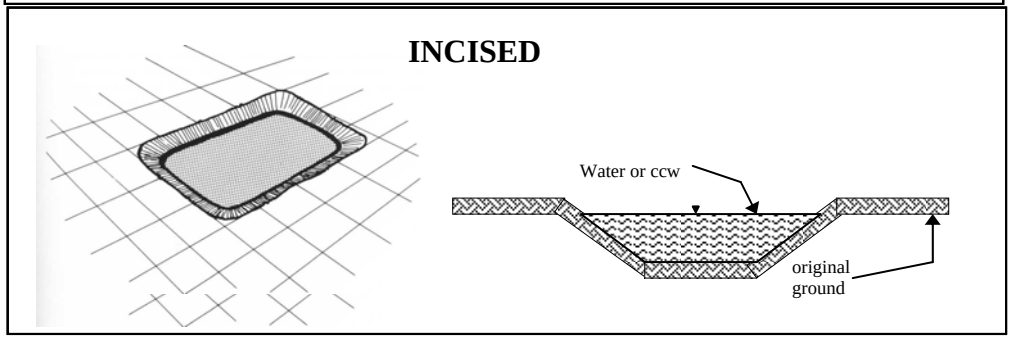
The impoundment is located in a rural area where there is no probable loss of human life, but could cause economic loss, environmental damage and disruption of lifeline facilities. Also, refer to State classification of Class II per MDNR letter (dated January 10, 2010) and Minnesota Rule 6115.0340. State's classification is equivalent to the Environmental Protection Agency's (EPA) Significant Hazard rating.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_X_____ Combination Incised/Diked

Embankment Height _22_____ feet
Pool Area _24_____ acres
Current Freeboard _3_____ feet

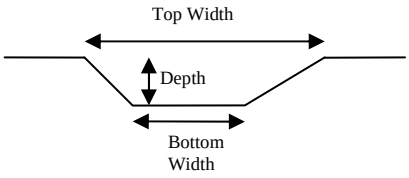
Embankment Material _Native, Silty Sand_
Liner _Double Composite; 60 mil HDPE and GCL_
Liner Permeability _<10^{-10} cm/s_____

TYPE OF OUTLET (Mark all that apply)

NA **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width

TRAPEZOIDAL



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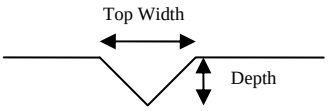
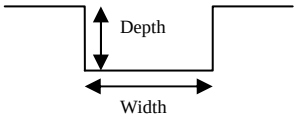
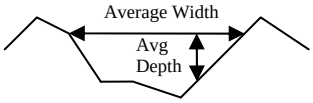


RECTANGULAR

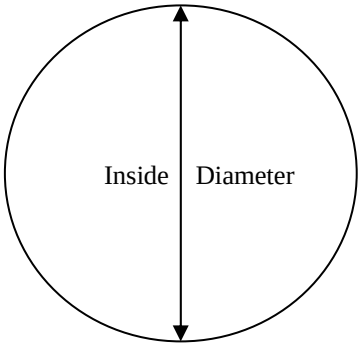


IRREGULAR



NA **Outlet**

_____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO _____ (NA)

X **No Outlet** (Water is Returned to Plant to be Recycled)

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Barr Engineering Company

Has there ever been a failure at this site? YES _____ NO _x_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO _X_____

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO _x_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

DAM SAFETY INSPECTION CHECKLIST

NAME OF DAM: Cell E

STATE ID #: MN0000990

REGISTERED: ☑ YES ☐ NO

NID ID #: MN01052

STATE SIZE CLASSIFICATION: Small

STATE HAZARD CLASSIFICATION: Significant

CHANGE IN HAZARD CLASSIFICATION REQUESTED?:

DAM LOCATION INFORMATION

CITY/TOWN: City of Hoyt Lakes

COUNTY: St. Louis, Minnesota

DAM LOCATION: 5699 Colby Lake Road, Hoyt Lakes, Minnesota
(street address if known)

ALTERNATE DAM NAME:

USGS QUAD.: Aurora, Minn Revised (1984)

LAT.: 47 31' 54"

LONG.: 92 10' 17"

DRAINAGE BASIN:

RIVER: N/A

IMPOUNDMENT NAME(S): Cell E, Cells A-D

GENERAL DAM INFORMATION

TYPE OF DAM: Incised and bermed Ash Impoundments

OVERALL LENGTH (FT): 5020

PURPOSE OF DAM: Ash Impoundment

NORMAL POOL STORAGE (ACRE-FT): 380

YEAR BUILT: 1999

MAXIMUM POOL STORAGE (ACRE-FT): 380

STRUCTURAL HEIGHT (FT): 1479

EL. NORMAL POOL (FT): 1476.0

HYDRAULIC HEIGHT (FT): 22

EL. MAXIMUM POOL (FT): 1476.0

☐ YES ☐ NO ☐ YES ☐ NO

NAME OF DAM: Cell E | STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 | NID ID #: MN01052

INSPECTION SUMMARY

DATE OF INSPECTION: September 23, 2010 | DATE OF PREVIOUS INSPECTION: May 1, 2010

TEMPERATURE/WEATHER: Rainy, 50 degrees F. | ARMY CORPS PHASE I: ☐ YES ☑ NO | If YES, date

CONSULTANT: GZA GeoEnvironmental, Inc | PREVIOUS DCR PHASE I: ☐ YES ☑ NO | If YES, date

BENCHMARK/DATUM: Mean Sea Level

OVERALL PHYSICAL CONDITION OF DAM: SATISFACTORY | DATE OF LAST REHABILITATION: N/A

SPILLWAY CAPACITY: 0-50% of the SDF or Unknown

EL. POOL DURING INSP.: 1476 | EL. TAILWATER DURING INSP.: N/A

PERSONS PRESENT AT INSPECTION

NAME	TITLE/POSITION	REPRESENTING
Lainie Plotnik	Operations Manager	Allete Inc., dba Minnesota Power
Mark Scharnott	Mechanical Engineer	Allete Inc., dba Minnesota Power
Blake Francis	Supervisor, Water Quality	Allete Inc., dba Minnesota Power
Thomas Radue	Senior Geotechnical Engineer	Barr Engineering Company
Doug Simon	Geological Engineering	GZA GeoEnvironmental, Inc
Patrick Harrison, P.E.	Senior Geotechnical Eng.	GZA GeoEnvironmental, Inc

EVALUATION INFORMATION

	Click on box to select E-code		Click on box to select E-code
E1) TYPE OF DESIGN	4	E8) LOW-LEVEL OUTLET CONDITION	
E2) LEVEL OF MAINTENANCE	4	E9) SPILLWAY DESIGN FLOOD CAPACITY	1
E3) EMERGENCY ACTION PLAN	4	E10) OVERALL PHYSICAL CONDITION	4
E4) EMBANKMENT SEEPAGE	5	E11) ESTIMATED REPAIR COST	
E5) EMBANKMENT CONDITION	4	ROADWAY OVER CREST	NO
E6) CONCRETE CONDITION	N/A	BRIDGE NEAR DAM	NO
E7) LOW-LEVEL OUTLET CAPACITY	1		

NAME OF INSPECTING ENGINEER: Patrick Harrison, P.E.; Doug Simon | SIGNATURE:

NAME OF DAM: Cell E

STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010

NID ID #: MN01052

OWNER:		CARETAKER:	
ORGANIZATION	Allete Inc., dba Minnesota Power	ORGANIZATION	Allete Inc., dba Minnesota Power
NAME/TITLE		NAME/TITLE	Lainie Plotnik, Thermal Business Operations
STREET	30 West Superior Street	STREET	5699 Colby Lake Road
TOWN, STATE, ZIP	Duluth, MN 55802	TOWN, STATE, ZIP	Hoyt Lakes, MN 55750
PHONE	(218)722-5642	PHONE	(218)225-4801
EMERGENCY PH. #	(218)225-4808	EMERGENCY PH. #	(218)225-4808
FAX		FAX	(218)225-2425
EMAIL		EMAIL	lplotnik@mnpower.com
OWNER TYPE	Private		

PRIMARY SPILLWAY TYPE: None Present, water Piped back to facility

SPILLWAY LENGTH (FT): N/A

SPILLWAY CAPACITY (CFS): N/A

AUXILIARY SPILLWAY TYPE: N/A

AUX. SPILLWAY CAPACITY (CFS): N/A

NUMBER OF OUTLETS: None Present

OUTLET(S) CAPACITY (CFS): N/A

TYPE OF OUTLETS: N/A

TOTAL DISCHARGE CAPACITY (CFS): N/A

DRAINAGE AREA (SQ MI): None outside impoundment

SPILLWAY DESIGN FLOOD (PERIOD/CFS): N/A

HAS DAM BEEN BREACHED OR OVERTOPPED ☐ YES ☑ NO IF YES, PROVIDE DATE(S)

FISH LADDER (LIST TYPE IF PRESENT): N/A

DOES CREST SUPPORT PUBLIC ROAD? ☐ YES ☑ NO IF YES, ROAD NAME:

PUBLIC BRIDGE WITHIN 50' OF DAM? ☐ YES ☑ NO IF YES, ROAD/BRIDGE NAME:

MHD BRIDGE NO. (IF APPLICABLE)

NAME OF DAM: Cell E STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 NID ID #: MN01052

EMBANKMENT (CREST)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
CREST	1. SURFACE TYPE	Gravel			
	2. SURFACE CRACKING	None Observed	x		
	3. SINKHOLES, ANIMAL BURROWS	None Observed	x		
	4. VERTICAL ALIGNMENT (DEPRESSIONS)	No depressions Observed	x		
	5. HORIZONTAL ALIGNMENT	No problems observed	x		
	6. RUTS AND/OR PUDDLES	Some potholes and puddles			X
	7. VEGETATION (PRESENCE/CONDITION)	N/A			
	8. ABUTMENT CONTACT	N/A	x		

ADDITIONAL COMMENTS: Potholes in Gravel should be filled and road graded.

NAME OF DAM: Cell E STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 NID ID #: MN01052

EMBANKMENT (D/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
D/S SLOPE	1. WET AREAS (NO FLOW)	None Observed	x		
	2. SEEPAGE	None Observed	x		
	3. SLIDE, SLOUGH, SCARP	None Observed	x		
	4. EMB.-ABUTMENT CONTACT	N/A	x		
	5. SINKHOLE/ANIMAL BURROWS	None Observed	x		
	6. EROSION	Small Erosional feature on East Segment, Old, vegetated		x	
	7. UNUSUAL MOVEMENT	None Observed	x		
	8. VEGETATION (PRESENCE/CONDITION)	Thick, unmowed grass covered most of the embankment, Two trees noted at toe of northwest corner			x

ADDITIONAL COMMENTS: The erosional feature is 10 feet long, 6 inches wide and about 4 inches deep and is located . Good vegetation coverage is present on all sides of the feature and in the feature.
Grass should be mowed to deter animal burrowing.

NAME OF DAM: Cell E STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 NID ID #: MN01052

EMBANKMENT (U/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
U/S SLOPE	1. SLIDE, SLOUGH, SCARP	None observed	x		
	2. SLOPE PROTECTION TYPE AND COND.	6" minus rip-rap	x		
	3. SINKHOLE/ANIMAL BURROWS	None observed	x		
	4. EMB.-ABUTMENT CONTACT	N/A	x		
	5. EROSION	None observed	x		
	6. UNUSUAL MOVEMENT	None observed	x		
	7. VEGETATION (PRESENCE/CONDITION)	Some Grass growth on rip-rap		x	

ADDITIONAL COMMENTS: Rip-rap should continue to be sprayed as needed to control vegetation growth on slope.

NAME OF DAM: Cell E STATE ID #: MN0000990

INSPECTION DATE: September 23, 2010 NID ID #: MN01052

INSTRUMENTATION

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
INSTR.	1. PIEZOMETERS	None present	x		
	2. OBSERVATION WELLS	None present on imbankments. Several observation wells for GW quality	x		
	3. STAFF GAGE AND RECORDER	Staff gauge read each shift. Electronic recorder continuously monitors water level.		x	
	4. WEIRS	None Present	x		
	5. INCLINOMETERS	None Present	x		
	6. SURVEY MONUMENTS	Four monuments present and measured anually.		x	
	7. DRAINS	None Present	x		
	8. FREQUENCY OF READINGS	Daily/continuous water levels, annual survey monitors.		x	
	9. LOCATION OF READINGS	Water level readings taken in pump house, Survey monitor locations provided below.	x		
		MP1- North 6908.454 East 9378.863			
		MP2 - North 6937.689 East 9354.078			
		MP3 - North 6648.896 East 8868.522			
		MP4 - North 6682.039 East 8867.852			

ADDITIONAL COMMENTS:

Appendix D

Cell E Impoundment Water Level Data

CELL E IMPOUNDMENT
WATER LEVEL DATA

23-Sep-09 00:00:00	1476.24
24-Sep-09 00:00:00	1476.2161
25-Sep-09 00:00:00	1476.1748
26-Sep-09 00:00:00	1476.1471
27-Sep-09 00:00:00	1476.113
28-Sep-09 00:00:00	1476.17
29-Sep-09 00:00:00	1476.166
30-Sep-09 00:00:00	1476.1138
01-Oct-09 00:00:00	1476.0699
02-Oct-09 00:00:00	1475.98
03-Oct-09 00:00:00	1475.95
04-Oct-09 00:00:00	1475.944
05-Oct-09 00:00:00	1475.8901
06-Oct-09 00:00:00	1475.8242
07-Oct-09 00:00:00	1475.7429
08-Oct-09 00:00:00	1475.6616
09-Oct-09 00:00:00	1475.5803
10-Oct-09 00:00:00	1475.506
11-Oct-09 00:00:00	1475.4783
12-Oct-09 00:00:00	1475.4344
13-Oct-09 00:00:00	1475.3925
14-Oct-09 00:00:00	1475.3143
15-Oct-09 00:00:00	1475.234
16-Oct-09 00:00:00	1475.1852
17-Oct-09 00:00:00	1475.1317
18-Oct-09 00:00:00	1475.1036
19-Oct-09 00:00:00	1475.1044
20-Oct-09 00:00:00	1475.1097
21-Oct-09 00:00:00	1475.0806
22-Oct-09 00:00:00	1475.17
23-Oct-09 00:00:00	1475.1591
24-Oct-09 00:00:00	1475.1511
25-Oct-09 00:00:00	1475.1318
26-Oct-09 00:00:00	1475.19
27-Oct-09 00:00:00	1475.16
28-Oct-09 00:00:00	1475.18
29-Oct-09 00:00:00	1475.2
30-Oct-09 00:00:00	1475.31
31-Oct-09 00:00:00	1475.3
01-Nov-09 00:00:00	1475.28
02-Nov-09 00:00:00	1475.29
03-Nov-09 00:00:00	1475.29
04-Nov-09 00:00:00	1475.28
05-Nov-09 00:00:00	1475.29
06-Nov-09 00:00:00	1475.24
07-Nov-09 00:00:00	1475.29
08-Nov-09 00:00:00	1475.3
09-Nov-09 00:00:00	1475.32
10-Nov-09 00:00:00	1475.32
11-Nov-09 00:00:00	1475.3

CELL E IMPOUNDMENT
WATER LEVEL DATA

12-Nov-09 00:00:00	1475.28
13-Nov-09 00:00:00	1475.3
14-Nov-09 00:00:00	1475.37
15-Nov-09 00:00:00	1475.42
16-Nov-09 00:00:00	1475.42
17-Nov-09 00:00:00	1475.4
18-Nov-09 00:00:00	1475.39
19-Nov-09 00:00:00	1475.37
20-Nov-09 00:00:00	1475.35
21-Nov-09 00:00:00	1475.33
22-Nov-09 00:00:00	1475.31
23-Nov-09 00:00:00	1475.32
24-Nov-09 00:00:00	1475.3
25-Nov-09 00:00:00	1475.27
26-Nov-09 00:00:00	1475.27
27-Nov-09 00:00:00	1475.2
28-Nov-09 00:00:00	1475.18
29-Nov-09 00:00:00	1475.2
30-Nov-09 00:00:00	1475.25
01-Dec-09 00:00:00	1475.26
02-Dec-09 00:00:00	1475.27
03-Dec-09 00:00:00	1475.26
04-Dec-09 00:00:00	1475.27
05-Dec-09 00:00:00	1475.26
06-Dec-09 00:00:00	1475.26
07-Dec-09 00:00:00	1475.29
08-Dec-09 00:00:00	1475.3
09-Dec-09 00:00:00	1475.31
10-Dec-09 00:00:00	1475.32
11-Dec-09 00:00:00	1475.32
12-Dec-09 00:00:00	1475.33
13-Dec-09 00:00:00	1475.33
14-Dec-09 00:00:00	1475.33
15-Dec-09 00:00:00	1475.35
16-Dec-09 00:00:00	1475.37
17-Dec-09 00:00:00	1475.37
18-Dec-09 00:00:00	1475.41
19-Dec-09 00:00:00	1475.4
20-Dec-09 00:00:00	1475.42
21-Dec-09 00:00:00	1475.43
22-Dec-09 00:00:00	1475.44
23-Dec-09 00:00:00	1475.43
24-Dec-09 00:00:00	1475.46
25-Dec-09 00:00:00	1475.5
26-Dec-09 00:00:00	1475.5
27-Dec-09 00:00:00	1475.51
28-Dec-09 00:00:00	1475.5
29-Dec-09 00:00:00	1475.52
30-Dec-09 00:00:00	1475.55
31-Dec-09 00:00:00	1475.54
01-Jan-10 00:00:00	1475.53
02-Jan-10 00:00:00	1475.54

CELL E IMPOUNDMENT
WATER LEVEL DATA

03-Jan-10 00:00:00	1475.59
04-Jan-10 00:00:00	1475.62
05-Jan-10 00:00:00	1475.64
06-Jan-10 00:00:00	1475.66
07-Jan-10 00:00:00	1475.67
08-Jan-10 00:00:00	1475.7
09-Jan-10 00:00:00	1475.72
10-Jan-10 00:00:00	1475.77
11-Jan-10 00:00:00	1475.8
12-Jan-10 00:00:00	1475.81
13-Jan-10 00:00:00	1475.83
14-Jan-10 00:00:00	1475.85
15-Jan-10 00:00:00	1475.83
16-Jan-10 00:00:00	1475.77
17-Jan-10 00:00:00	1475.7
18-Jan-10 00:00:00	1475.68
19-Jan-10 00:00:00	1475.7
20-Jan-10 00:00:00	1475.72
21-Jan-10 00:00:00	1475.76
22-Jan-10 00:00:00	1475.78
23-Jan-10 00:00:00	1475.8
24-Jan-10 00:00:00	1475.87
25-Jan-10 00:00:00	1475.93
26-Jan-10 00:00:00	1475.97
27-Jan-10 00:00:00	1475.98
28-Jan-10 00:00:00	1476
29-Jan-10 00:00:00	1476
30-Jan-10 00:00:00	1475.98
31-Jan-10 00:00:00	1475.97
01-Feb-10 00:00:00	1475.95
02-Feb-10 00:00:00	1475.95
03-Feb-10 00:00:00	1475.93
04-Feb-10 00:00:00	1475.9
05-Feb-10 00:00:00	1475.88
06-Feb-10 00:00:00	1475.89
07-Feb-10 00:00:00	1475.88
08-Feb-10 00:00:00	1475.87
09-Feb-10 00:00:00	1475.88
10-Feb-10 00:00:00	1475.88
11-Feb-10 00:00:00	1475.88
12-Feb-10 00:00:00	1475.86
13-Feb-10 00:00:00	1475.85
14-Feb-10 00:00:00	1475.83
15-Feb-10 00:00:00	1475.88
16-Feb-10 00:00:00	1475.84
17-Feb-10 00:00:00	1475.83
18-Feb-10 00:00:00	1475.81
19-Feb-10 00:00:00	1475.79
20-Feb-10 00:00:00	1475.77
21-Feb-10 00:00:00	1475.78
22-Feb-10 00:00:00	1475.81
23-Feb-10 00:00:00	1475.83

CELL E IMPOUNDMENT
WATER LEVEL DATA

24-Feb-10 00:00:00	1475.81
25-Feb-10 00:00:00	1475.79
26-Feb-10 00:00:00	1475.8
27-Feb-10 00:00:00	1475.79
28-Feb-10 00:00:00	1475.76
01-Mar-10 00:00:00	1475.75
02-Mar-10 00:00:00	1475.76
03-Mar-10 00:00:00	1475.75
04-Mar-10 00:00:00	1475.74
05-Mar-10 00:00:00	1475.76
06-Mar-10 00:00:00	1475.77
07-Mar-10 00:00:00	1475.82
08-Mar-10 00:00:00	1475.87
09-Mar-10 00:00:00	1475.87
10-Mar-10 00:00:00	1475.89
11-Mar-10 00:00:00	1475.89
12-Mar-10 00:00:00	1475.89
13-Mar-10 00:00:00	1475.92
14-Mar-10 00:00:00	1475.97
15-Mar-10 00:00:00	1475.97
16-Mar-10 00:00:00	1476.02
17-Mar-10 00:00:00	1476.0233
18-Mar-10 00:00:00	1476.0432
19-Mar-10 00:00:00	1476.03
20-Mar-10 00:00:00	1476.0017
21-Mar-10 00:00:00	1475.99
22-Mar-10 00:00:00	1475.9882
23-Mar-10 00:00:00	1475.97
24-Mar-10 00:00:00	1475.9543
25-Mar-10 00:00:00	1475.91
26-Mar-10 00:00:00	1475.8876
27-Mar-10 00:00:00	1475.8715
28-Mar-10 00:00:00	1475.88
29-Mar-10 00:00:00	1475.8744
30-Mar-10 00:00:00	1475.8928
31-Mar-10 00:00:00	1475.8884
01-Apr-10 00:00:00	1475.8732
02-Apr-10 00:00:00	1475.8763
03-Apr-10 00:00:00	1475.87
04-Apr-10 00:00:00	1475.8242
05-Apr-10 00:00:00	1475.87
06-Apr-10 00:00:00	1475.8768
07-Apr-10 00:00:00	1475.8411
08-Apr-10 00:00:00	1475.83
09-Apr-10 00:00:00	1475.78
10-Apr-10 00:00:00	1475.75
11-Apr-10 00:00:00	1475.7203
12-Apr-10 00:00:00	1475.7
13-Apr-10 00:00:00	1475.66
14-Apr-10 00:00:00	1475.6285
15-Apr-10 00:00:00	1475.6113
16-Apr-10 00:00:00	1475.5151

CELL E IMPOUNDMENT
WATER LEVEL DATA

17-Apr-10 00:00:00	1476.49
18-Apr-10 00:00:00	1475.4465
19-Apr-10 00:00:00	1475.4084
20-Apr-10 00:00:00	1475.3633
21-Apr-10 00:00:00	1475.3243
22-Apr-10 00:00:00	1475.2717
23-Apr-10 00:00:00	1475.3586
24-Apr-10 00:00:00	1475.4835
25-Apr-10 00:00:00	1475.8451
26-Apr-10 00:00:00	1476.1814
27-Apr-10 00:00:00	1476.3914
28-Apr-10 00:00:00	1476.6226
29-Apr-10 00:00:00	1476.8258
30-Apr-10 00:00:00	1477.0366
01-May-10 00:00:00	1477.0947
02-May-10 00:00:00	1477.153
03-May-10 00:00:00	1477.2111
04-May-10 00:00:00	1477.2693
05-May-10 00:00:00	1477.3274
06-May-10 00:00:00	1477.3887
07-May-10 00:00:00	1477.3723
08-May-10 00:00:00	1477.394
09-May-10 00:00:00	1477.3885
10-May-10 00:00:00	1477.4
11-May-10 00:00:00	1477.3933
12-May-10 00:00:00	1477.373
13-May-10 00:00:00	1477.4027
14-May-10 00:00:00	1477.4524
15-May-10 00:00:00	1477.4602
16-May-10 00:00:00	1477.45
17-May-10 00:00:00	1477.45
18-May-10 00:00:00	1477.4508
19-May-10 00:00:00	1477.4692
20-May-10 00:00:00	1477.4607
21-May-10 00:00:00	1477.4808
22-May-10 00:00:00	1477.4404
23-May-10 00:00:00	1477.42
24-May-10 00:00:00	1477.4257
25-May-10 00:00:00	1477.4264
26-May-10 00:00:00	1477.3843
27-May-10 00:00:00	1477.3224
28-May-10 00:00:00	1477.299
29-May-10 00:00:00	1477.2682
30-May-10 00:00:00	1477.2511
31-May-10 00:00:00	1477.2533
01-Jun-10 00:00:00	1477.2291
02-Jun-10 00:00:00	1477.201
03-Jun-10 00:00:00	1477.1
04-Jun-10 00:00:00	1477.14
05-Jun-10 00:00:00	1477.1476
06-Jun-10 00:00:00	1477.1525
07-Jun-10 00:00:00	1477.1548

CELL E IMPOUNDMENT
WATER LEVEL DATA

08-Jun-10 00:00:00	1477.126
09-Jun-10 00:00:00	1477.1777
10-Jun-10 00:00:00	1477.156
11-Jun-10 00:00:00	1477.1174
12-Jun-10 00:00:00	1477.1095
13-Jun-10 00:00:00	1477.1176
14-Jun-10 00:00:00	1477.0978
15-Jun-10 00:00:00	1477.0785
16-Jun-10 00:00:00	1477.082
17-Jun-10 00:00:00	1477.0879
18-Jun-10 00:00:00	1477.0538
19-Jun-10 00:00:00	1477.0165
20-Jun-10 00:00:00	1477
21-Jun-10 00:00:00	1476.9924
22-Jun-10 00:00:00	1476.9956
23-Jun-10 00:00:00	1477.0092
24-Jun-10 00:00:00	1476.9568
25-Jun-10 00:00:00	1476.99
26-Jun-10 00:00:00	1476.9806
27-Jun-10 00:00:00	1476.9982
28-Jun-10 00:00:00	1476.9453
29-Jun-10 00:00:00	1476.81
30-Jun-10 00:00:00	1476.8199
01-Jul-10 00:00:00	1476.7848
02-Jul-10 00:00:00	1476.7263
03-Jul-10 00:00:00	1476.6912
04-Jul-10 00:00:00	1476.6145
05-Jul-10 00:00:00	1476.6543
06-Jul-10 00:00:00	1476.6141
07-Jul-10 00:00:00	1476.5785
08-Jul-10 00:00:00	1476.5675
09-Jul-10 00:00:00	1476.5262
10-Jul-10 00:00:00	1476.4561
11-Jul-10 00:00:00	1476.3826
12-Jul-10 00:00:00	1476.3101
13-Jul-10 00:00:00	1476.2887
14-Jul-10 00:00:00	1476.256
15-Jul-10 00:00:00	1476.3274
16-Jul-10 00:00:00	1476.3132
17-Jul-10 00:00:00	1476.3141
18-Jul-10 00:00:00	1476.2819
19-Jul-10 00:00:00	1476.2446
20-Jul-10 00:00:00	1476.2037
21-Jul-10 00:00:00	1476.25
22-Jul-10 00:00:00	1476.2168
23-Jul-10 00:00:00	1476.2385
24-Jul-10 00:00:00	1476.2339
25-Jul-10 00:00:00	1476.22
26-Jul-10 00:00:00	1476.2072
27-Jul-10 00:00:00	1476.1581
28-Jul-10 00:00:00	1476.14
29-Jul-10 00:00:00	1476.0959

CELL E IMPOUNDMENT
WATER LEVEL DATA

30-Jul-10 00:00:00	1476.0536
31-Jul-10 00:00:00	1476.0601
01-Aug-10 00:00:00	1476.0353
02-Aug-10 00:00:00	1476.0791
03-Aug-10 00:00:00	1476.12
04-Aug-10 00:00:00	1476.0964
05-Aug-10 00:00:00	1476.0632
06-Aug-10 00:00:00	1476.0017
07-Aug-10 00:00:00	1475.9633
08-Aug-10 00:00:00	1474.9149
09-Aug-10 00:00:00	1475.9299
10-Aug-10 00:00:00	1475.9011
11-Aug-10 00:00:00	1475.8832
12-Aug-10 00:00:00	1475.9111
13-Aug-10 00:00:00	1475.92
14-Aug-10 00:00:00	1475.8756
15-Aug-10 00:00:00	1475.8286
16-Aug-10 00:00:00	1475.7848
17-Aug-10 00:00:00	1475.7311
18-Aug-10 00:00:00	1475.75
19-Aug-10 00:00:00	1475.7135
20-Aug-10 00:00:00	1475.7349
21-Aug-10 00:00:00	1475.84
22-Aug-10 00:00:00	1475.8644
23-Aug-10 00:00:00	1475.899
24-Aug-10 00:00:00	1475.89
25-Aug-10 00:00:00	1475.8888
26-Aug-10 00:00:00	1475.8615
27-Aug-10 00:00:00	1475.8781
28-Aug-10 00:00:00	1475.9127
29-Aug-10 00:00:00	1475.9
30-Aug-10 00:00:00	1475.92
31-Aug-10 00:00:00	1475.9255
01-Sep-10 00:00:00	1475.9729
02-Sep-10 00:00:00	1476.04
03-Sep-10 00:00:00	1476.1617
04-Sep-10 00:00:00	1476.1814
05-Sep-10 00:00:00	1476.1716
06-Sep-10 00:00:00	1476.1913
07-Sep-10 00:00:00	1476.2109
08-Sep-10 00:00:00	1476.3284
09-Sep-10 00:00:00	1476.2594
10-Sep-10 00:00:00	1476.1935
11-Sep-10 00:00:00	1476.1719
12-Sep-10 00:00:00	1476.2156
13-Sep-10 00:00:00	1476.2593
14-Sep-10 00:00:00	1476.2866
15-Sep-10 00:00:00	1476.3236
16-Sep-10 00:00:00	1476.3041
17-Sep-10 00:00:00	1476.2782
18-Sep-10 00:00:00	1476.25
19-Sep-10 00:00:00	1476.24

CELL E IMPOUNDMENT
WATER LEVEL DATA

20-Sep-10 00:00:00	1476.142
21-Sep-10 00:00:00	1476.0753
22-Sep-10 00:00:00	1476.0267
23-Sep-10 00:00:00	1475.9976

Appendix E

Photographs

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: Laskin Energy Center Hoyts Lake, MN	Project No. 01.0170142.20

Photo No. 1	Date: 9/23/10

Direction Photo Taken:
North

Description:
Upstream slope looking toward ash pipe trestle in Cell E impoundment.

Photo No. 2	Date: 9/23/10

Direction Photo Taken:
North

Description:
Upstream slope looking at ash pipe trestle in Cell E impoundment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: Laskin Energy Center Hoyts Lake, MN	Project No. 01.0170142.20

Photo No. 3	Date: 9/23/10

Direction Photo Taken:
West

Description:
Looking west across Cell E impoundment

Photo No. 4	Date: 9/23/10

Direction Photo Taken:
West

Description:
Upstream slope of Cell E impoundment

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: Laskin Energy Center Hoyts Lake, MN	Project No. 01.0170142.20

Photo No. 5	Date: 9/23/10

Direction Photo Taken:
West

Description:
Upstream slope in Cell E impoundment.

Photo No. 6	Date: 9/23/10

Direction Photo Taken:
West

Description:
Upstream slope in Cell E impoundment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No. 7	Date: 9/23/10

Direction Photo Taken:
Southwest

Description:
Upstream slope in Cell E impoundment.

Photo No. 8	Date: 9/23/10

Direction Photo Taken:
Southwest

Description:
Upstream slope in Cell E impoundment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
9	9/23/10

Direction Photo Taken:
West

Description:
Settlement curtain anchor through top of embankment above the composite liner system.

Photo No.	Date:
10	9/23/10

Direction Photo Taken:
Northeast

Description:
Upstream slope in Cell E impoundment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
11	9/23/10

Direction Photo Taken:
South

Description:
Upstream slope and top of embankment in Cell E impoundment.

Photo No.	Date:
12	9/23/10

Direction Photo Taken:
West

Description:
Upstream slope and settlement curtain in Cell E impoundment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No. 13	Date: 9/23/10

Direction Photo Taken:
West

Description:
Upstream slope and ash delta in Cell E

Photo No. 14	Date: 9/23/10

Direction Photo Taken:
North

Description:
Upstream slope and top of embankment in Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
15	9/23/10

Direction Photo Taken:
West

Description:
Top of embankment in Cell E.

Photo No.	Date:
16	9/23/10

Direction Photo Taken:
West

Description:
Top of embankment in Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
17	9/23/10

Direction Photo Taken:
South

Description:
Example of potholes in top of embankment in Cell E.

Photo No.	Date:
18	9/23/10

Direction Photo Taken:
West

Description:
Top of embankment in Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
19	9/23/10

Direction Photo Taken:
East

Description:
Top of embankment in Cell E.

Photo No.	Date:
20	9/23/10

Direction Photo Taken:
North

Description:
Top of embankment in Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
21	9/23/10

Direction Photo Taken:
South

Description:
Top of embankment in Cell E.

Photo No.	Date:
22	9/23/10

Direction Photo Taken:
West

Description:
Downstream slope and toe of Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No. 23	Date: 9/23/10

Direction Photo Taken:
West

Description:
Downstream slope and toe of Cell E.

Photo No. 24	Date: 9/23/10

Direction Photo Taken:
Southwest

Description:
Downstream slope and toe of Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
25	9/23/10

Direction Photo Taken:
West

Description:
Manhole for accessing water return lines for Cell E.

Photo No.	Date:
26	9/23/10

Direction Photo Taken:
West

Description:
Downstream slope of Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
27	9/23/10

Direction Photo Taken:
Southwest

Description:
Downstream slope and toe of Cell E. Trees growing on the slope are shown on right of photo.

Photo No.	Date:
28	9/23/10

Direction Photo Taken:
South

Description:
Downstream slope and toe of Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
29	9/23/10

Direction Photo Taken:
South

Description:
Downstream slope and toe of Cell E.

Photo No.	Date:
30	9/23/10

Direction Photo Taken:
East

Description:
Downstream slope and toe of Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No. 31	Date: 9/23/10

Direction Photo Taken:
East

Description:
Downstream slope and toe of Cell E.

Photo No. 32	Date: 9/23/10

Direction Photo Taken:
East

Description:
Downstream slope and toe of Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
33	9/23/10

Direction Photo Taken:
Northwest

Description:
Downstream slope and toe of Cell E.

Photo No.	Date:
34	9/23/10

Direction Photo Taken:
South

Description:
Erosion feature on toe of east slope that has been overgrown with grass.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
35	9/23/10

Direction Photo Taken:
South

Description:
Erosion feature on toe of east slope that has been overgrown with grass.

Photo No.	Date:
36	9/23/10

Direction Photo Taken:
West

Description:
Ash pipe trestle discharge location in Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
37	9/23/10

Direction Photo Taken:
South

Description:
Ash pipe trestle discharge location in Cell E.

Photo No.	Date:
38	9/23/10

Direction Photo Taken:
South

Description:
Bottom ash discharge pipe and delta in Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
39	9/23/10

Direction Photo Taken:
South

Description:
Staff gauge located on southwest corner of pump house in Cell E.

Photo No.	Date:
40	9/23/10

Direction Photo Taken:
North

Description:
Pump house in Cell E.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
41	9/23/10

Direction Photo Taken:
North

Description:
View from top of embankment in Cells A-D impoundment.

Photo No.	Date:
42	9/23/10

Direction Photo Taken:
Northwest

Description:
View from top of embankment in Cells A-D impoundment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
43	9/23/10

Direction Photo Taken:
North

Description:
Top of embankment in Cells A-D impoundment.

Photo No.	Date:
44	9/23/10

Direction Photo Taken:
Northwest

Description:
Impounded ash in Cell A of the Cells A-D impoundment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
45	9/23/10

Direction Photo Taken:
West

Description:
Top of embankment in Cells A-D impoundment.

Photo No.	Date:
46	9/23/10

Direction Photo Taken:
West

Description:
Top of embankment in Cells A-D impoundment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
47	9/23/10

Direction Photo Taken:
South

Description:
Former pumphouse and decant structure for the Cells A-D impoundment.

Photo No.	Date:
48	9/23/10

Direction Photo Taken:
West

Description:
Looking west over the embankment that partially separates Cells A and B.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Laskin Energy Center Hoyt Lakes, MN	Project No. 01.0170142.20

Photo No.	Date:
49	9/23/10

Direction Photo Taken:
North

Description:
Impounded ash and upstream embankment in Cells A-D impoundment.

Photo No.	Date:
50	9/23/10

Direction Photo Taken:
East

Description:
Impounded ash in Cells A-D impoundment.

Appendix F

References

CELLS A-D IMPOUNDMENT AND CELL E IMPOUNDMENT
ALLETE, INC. LASKIN ENERGY CENTER
HOYTS LAKE, MINNESOTA

REFERENCE LIST

Summary Memo Prepared by Barr Engineering Company (Barr): Laskin Energy Center – Ash Pond Cell E, Minnesota Power, Undated.

General Maintenance Plan, Ash Disposal Ponds, Laskin Energy Center, Undated.

Ash Pond Inspection Program, NPDES Permit N. MN0000990, Laskin Energy Center, Undated.

March 2009 response by ALLETE, Inc. to EPA CERCLA Section 104(e) Information Request for Surface Impoundments, Enclosure 2.

Letter to Mark Scharnott regarding Laskin Energy Ash Dams, NID MN01052, St. Louis County, Dana Dostert of Division of Waters, January 4, 2010.

Laskin Ash Pond Monitors, K. Busche and R. Gaffice. Dated May 28, 2009.

Ash Pond Embankments – Spring 2009 Inspection Report, Laskin Energy Center, BARR Engineering Company, Dated July 17, 2009.

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“Index and Location Map, Horizontal Ash Pond Expansion, Laskin Energy Center -- Hoyt Lakes, Minnesota.” Drawing Number C-01. Generated by Barr, Dated January 6, 1999.

“Existing Conditions Plan, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota.” Generated by Barr, Drawing Number C-02.

“Pond Layout Plan – Final Grade, Horizontal Ash Pond Extension, Laskin Energy Center – Hoyt Lakes, Minnesota.” Drawing Number C-03. Dated December 28, 1998.

“Pond Layout Plan – Coordinates, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota” Drawing Number C-04, Generated by Barr, Dated December 28, 1998.

“Plan Details, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota” Drawing Number C-05. Generated by Barr, Dated January 19, 1999.

“Perimeter Dike Sections, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota.” Drawing Number C-06. Generated by Barr, Dated January 26, 1999.

“Wave Protection Sections, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota” Drawing Number C-07, Generated by Barr, Dated January 29, 2010.

“Details, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota” Drawing Number C-08, Generated by Barr, Dated January 28, 1999.

"Cross Sections North-South, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota" Drawing Number C-09, Generated by Barr, Dated February 15, 1999.

"Cross Sections East-West, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota" Drawing Number C-10, Generated by Barr, Dated February 15, 1999.

"Preliminary Closure Plan (Not In Contract), Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota" Drawing Number C-11, Generated by Barr, Dated February 17, 1999.

"Preliminary Closure Plan Sections and Details, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota" Drawing Number C-12, Generated by Barr, Dated March 3, 1999.

"Pipe Support/Walkway 75' Walkway Plan and Elevation, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota" Drawing Number S-01, Generated by Barr, Dated January 14, 1999.

"Pipe Support/Walkway Support Frame Option, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota" Drawing Number S-02, Generated by Barr, Dated January 14, 1999.

"Pipe Support/Walkway Concrete Details, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota" Drawing Number S-03, Generated by Barr, Dated January 14, 2010.

"Pipe Support/Walkway Steel Details, Horizontal Ash Pond Expansion, Laskin Energy Center – Hoyt Lakes, Minnesota" Drawing Number S-04, Generated by Barr, Dated January 14, 2010.

Laskin Energy Center Ash Pond Cell E Emergency Action Plan (EAP), Barr Engineering Company, Dated October 6, 2010.

Aerial Photograph Showing Laskin Wells, Undated.

Laskin Ash Pond Monitors, R. Gaffice and D. Prudhomme, Dated October 5, 2010.

Email correspondence from Barr Engineering November 17, 2010 regarding seepage and slope stability, and hydraulic analysis of Cell E impoundment.